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ABSTRACT

Title VI-A provides matching federal funds for the purchase of college and university laboratory and audiovisual equipment, closed-circuit television equipment and classroom materials related to the improvement of undergraduate education. This report presents case studies of 12 institutions which obtained Title VI-A funds in the past 4 years. The projects selected represent a cross-section of all types of projects funded, different types of institutional control, lengths of undergraduate program, project subject area, and project magnitude. Both public and private, 2-year and 4-year institutions were selected. The applications cover requisitions for the humanities, physical, social, and biological sciences, campus-wide programs, and closed-circuit television. Federal shares ranged from $1,006 to $49,715. Along with a description of each project, responses to a survey conducted at each institution are discussed. The survey covered: impact of the project, cost, space and time factors, student and faculty reactions, state agency assistance in planning, and ancillary outcomes. (JS)

ED052674

TITLE VI-A

# HIGHER EDUCATION ACT

IN

# NEW YORK STATE

## 4-YEAR REPORT

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# HIGHLIGHTS

* Title VI–A provided Federal matching funds for equipment and materials to improve undergraduate instruction.
* Colleges and universities in New York State received $4,698,660 in Title VI–A funds. Private institutions received 56 percent of this amount; units of the State University and the City University obtained 32 percent and 12 percent, respectively.
* Title VI–A grants in this State benefitted a total of 862,765 undergraduates.
* The average cost per student for all Federal funds spent on Title VI–A projects in New York State was $5.38.

Twelve Title VI–A grants, representative of the 299 projects funded in New York State with regard to subject area, amount of the award, type of institutional control, and length of the undergraduate program, were selected for intensive study including on-site visits. The principle points derived from this study are:

* All projects were part of continuing plans for instructional improvement at the various campuses.
* Equipment and materials acquired with Title VI–A moneys placed increased demands on faculty time. These demands could be alleviated through additional supporting technical personnel. Greater selectivity in the expenditure of these funds would have been possible if projects were supported for more than a calendar year.
* Students and faculty have reacted with favor to Title VI–A acquisitions. Many instructional items included in the projects have supported a mediated approach to independent study.
* Individuals responsible for administering the projects studied, requested State Education Department assistance in obtaining information and consultation on technological developments for the improvement of undergraduate instruction.

# FOREWORD

America's colleges and universities face a critical problem: to offer an increasing mass of information to a burgeoning student population without sacrificing the quality of education. Since 1958, under Title III of the National Defense Education Act, more than $40 million in Federal matching money has been provided for new teaching equipment and up-to-date materials for elementary and secondary schools in New York State alone. Colleges and universities, therefore, often face a student body quite sophisticated in its familiarity with modern technological equipment used in the classroom.

In order that colleges and universities might keep pace with these technological advances in educational materials and equipment, Senator Ralph W. Yarborough (Texas) and Congressman Hugh L. Carey (New York) sponsored an amendment to the Higher Education Act of 1965, which became Title VI of the Act. The Act was passed by Congress and signed into law by the President on November 8, 1965.

Title VI–A provides Federal matching funds for the purchase of laboratory and audiovisual equipment, closed-circuit television equipment, and classroom materials for the improvement of instruction at the undergraduate level. Since 1965, more than $58 million in Federal matching money has been provided nationally for the purchase of new teaching equipment and up-to-date materials for colleges and universities under Title VI–A of the Higher Education Act of 1965.

In New York State alone, colleges and universities have received over $4½ million under Title VI–A since the inception of the Act. Nearly $500,000 of this amount has been used for closed-circuit television equipment. The remainder has been used for projects in a wide range of subject areas, major portions going to science and campus wide projects.

For the first 3 years of the program, the total amount requested by institutions in New York State showed a steady increase, while the funds available remained relatively constant. Requests for Federal fiscal year 1969, however, were somewhat below those of 1968. This decrease might be attributed in part to discouragement of some institutions by the increasing competition for Title VI–A funds. The number of institutions receiving grants has decreased each successive year although the average amount of the Federal share has increased.

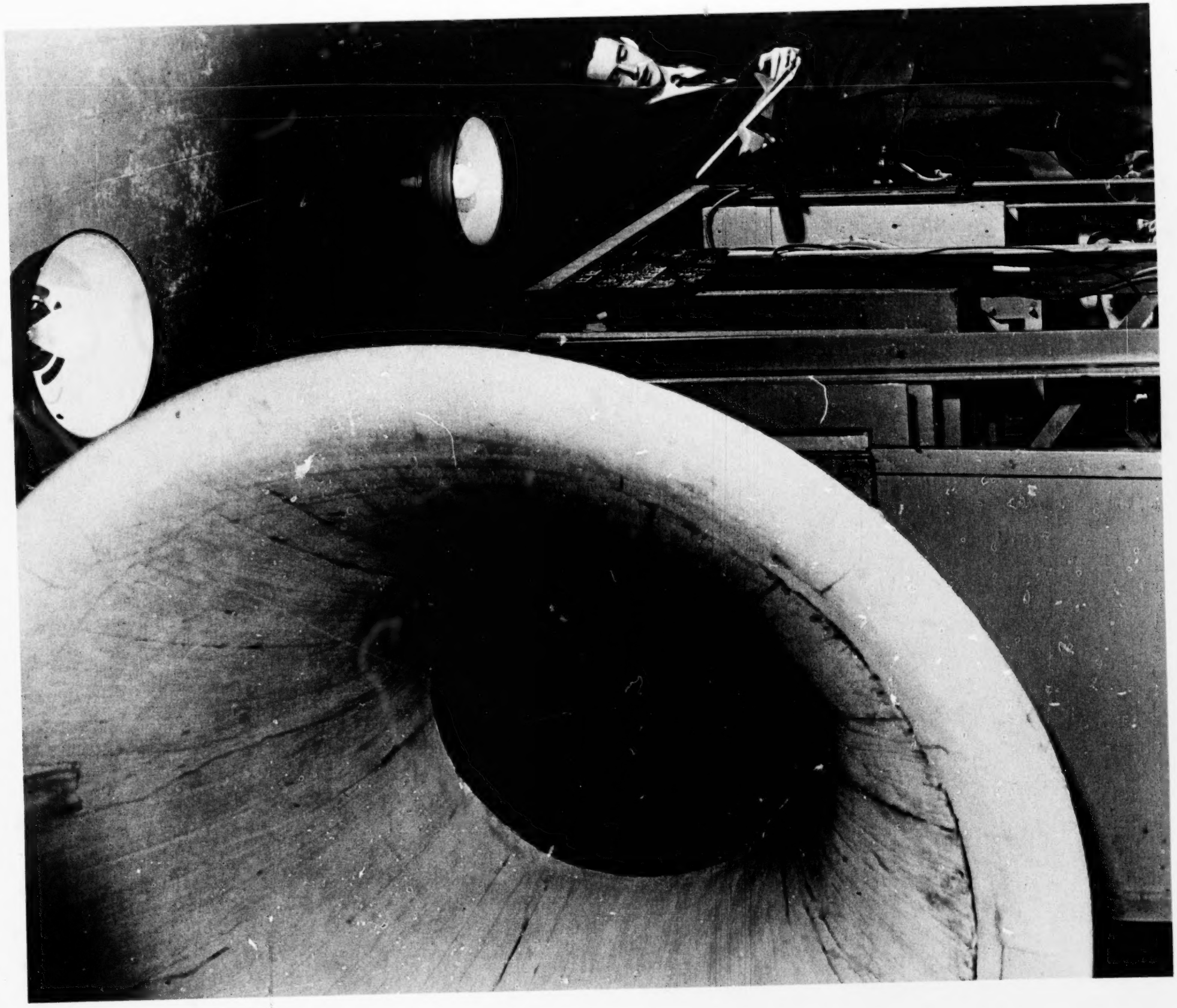
Applications are awarded grants on the basis of a point system. Seventy of 100 points are awarded according to objective criteria specified in Federal regulations and in the State Plan. The remaining 30 points are awarded by a panel of experts in each of the five subject areas.

Twelve institutions which obtained Title VI–A funds in the past 4 years were selected for case studies. The projects selected for study represent a cross section of all types of projects funded. They are representative of types of institutional control, length of undergraduate program, subject area of the project, and magnitude of the project. Both public and private, 2-year and 4-year institutions have been selected. The 12 applications cover requests for the humanities, social sciences, physical and biological sciences, and campus-wide use as well as for closed-circuit television. The Federal shares requested by these 12 institutions range from $1,006 to $49,715.

In addition to the case studies, the 12 institutions were surveyed to determine the projects' impact on undergraduate programs at the colleges and universities. Interviews were conducted at the institutions by Mr. Robert Milkman and Miss Marcia Orkis of the State Commission staff, June 4 through June 23, 1969.

Survey questions, prepared with the assistance of three consultants, were used as a guide in determining to what extent the projects had contributed to the improvement of undergraduate instruction in New York State. These questions were used to elicit information under the following major topics of discussion: Impact of the Project upon the Institution; Cost, Space, and Time Factors; Student and Faculty Reaction to the Use of New Equipment and Materials; State Agency Assistance in Planning; Ancillary Outcomes. The full form of the survey instrument is included as an Appendix.

# CASE STUDIES



# ACADEMY OF AERONAUTICS

## Year: 1969 Grant Request: $4,132

*Description: Wind tunnel for the Improvement of Instruction in Aircraft Design Technology and Aircraft Maintenance Technology*

The Academy of Aeronautics at LaGuardia Airport offers one program in Aircraft Design Technology and a second in Aircraft Maintenance Technology. These courses are designed to prepare students for positions in industry as aircraft engineering technicians. Because of the applied nature of the two programs, it is necessary that a great deal of laboratory work be included in the curriculum and that it be accurate.

At present the Academy is working with a wind tunnel which has been in operation since 1937. Modifications necessitated by a relocation of the equipment have impaired the operation of the wind tunnel so that the data obtained from demonstrations are not reliable. The equipment is designed to provide the student with experiences in wind tunnel operation, and in dealing mathematically with the data from experiments conducted in the tunnel. However, with a defective wind tunnel, it is impossible for the student to obtain a realistic picture of experimental data. The present apparatus is also inadequate for demonstration purposes, since extensive advance preparation is necessary for its operation. Its size also limits the number of students who may observe the operation at one time.

A new wind tunnel and supporting equipment which will be provided by $4,132 in matching Title VI–A funds will have the capability of measuring more accurately the factors involved in aerodynamic principles. Procedures and results will be more closely related to actual operations in industry, thereby increasing the value of the experiments. Demonstrations of aerodynamics and theory of flight principles will be extended to students who are currently taught this material on a lecture and visual aid basis. Aircraft Design Technology students will have the equipment easily available to them without the presently necessary lengthy setup time.

All students at the Academy will benefit from the purchase of the new wind tunnel. Freshmen in a survey course will gain a basic understanding of the effects of airflow upon an aircraft while more advanced students will be able to use the equipment in preparing degree projects required of all candidates for graduation.

*Academy of Aeronautics: Wind Tunnel for the Improvement of Instruction in Aircraft Design Technology and Aircraft Maintenance Technology*

Respondent: Mr. George W. Brush, Executive Dean

### *Impact of the Project*

Dean Brush emphasized that, because of accelerated changes in the aircraft industry. frequent curriculum review is essential. There is an urgent need for laboratory support to match theoretical instruction in structural design, aircraft propulsion, and aerodynamics. Familiarization with air flow, as illustrated through use of a properly functioning wind tunnel, is central to each area of study. Planning for future translation of theoretical instruction to direct laboratory experience calls for the installation of a supersonic tunnel which will facilitate the teaching of basic super-aerodynamics.

### *Space and Time Factors*

A competent staff is already available at the Academy of Aerodynamics to instruct students in proper utilization of the wind tunnel. Space required for the new apparatus is approximately 80 square feet — less than half that required by the obsolete model. Dean Brush also noted that much less time for preparation and cleanup would be required with the new equipment because it is powered by electricity instead of an internal combustion engine. A considerable reduction in noise is also anticipated.

### *Student and Faculty Reaction*

The respondent stated that the project lends itself well to small team experimentation and the assignment of individual study in aerodynamics. Success of such applications of the wind tunnel will be measured by the number of additional graduates who pursue careers in aerodynamics. Individual employment objectives are determined through an annual written survey and regional conferences with the alumni of the Academy.

### *State Agency Assistance*

Dean Brush suggested that the State Education Department offer consultative services regarding the integration of educational technology into the Academy's curriculum.

## MONROE COMMUNITY COLLEGE

Year: 1968 Grant Request: $15,000

*Description: Expansion of a Closed-Circuit Television System*

In 1967, Monroe Community College had in use an extensive closed-circuit television system. A 33 camera system and console was operating at one city hospital for direct instruction and supervision of nursing students, and a 36 camera system at a second hospital was under construction. Video tape recorders were also used in music education, physical education, and in various other classes on a limited basis.

Origination equipment for two studios and a distribution system consisting of nine channels was under construction. Reception equipment was necessary, however, if the origination equipment was to be used upon installation. To complete the major portion of this television system, a Title VI–A grant was requested in 1968.

Although the small number of receivers available limited use of closed-circuit television, it was enthusiastically approved and accepted by those faculty members who used it. Close cooperation between the Department of Instructional Services and the faculty led to numerous requests for additional receivers.

Through the 1968 grant, 75 receivers were installed in various lecture halls and laboratories throughout the campus, bringing the total available to 100. The 1968 proposal also provided funds for four video tape recorders and cameras and for a film chain for viewing motion pictures, both those produced by the Department of Instructional Services and commercial films. Reception of closed-circuit television programs is now possible in all lecture halls, laboratories, and classrooms on the campus.

Since the distribution system is capable of airing nine programs simultaneously, it is possible to produce a total of 630 television class hours per week. This is based on a 5-day week with 14 class periods per day. The number of students who can benefit from such an installation is enormous.

With the capacity for such widespread use of closed-circuit television, it is imperative that equipment be used in the most efficient and effective way possible. The 1968 Title VI–A proposal was directed toward this end. The Department of Instructional Services staff works closely with faculty members to help develop high quality materials and programs.

The closed-circuit television system has expanded since the 1968 Title VI–A grant to include a second origination studio which has increased the flexibility necessary to produce highly polished programs which meet instructional objectives.

*Monroe Community College: Expansion of a Closed-Circuit Television System*

Respondent: Mr. Leslie Wetherbee, Assistant Professor and Chief Engineer of the Instructional Services Center

*Impact of the Project*

Mr. Wetherbee pointed out that the 1968 Title VI–A project at Monroe Community College is one component of a long range plan to provide closed-circuit television in all classrooms. An intercommunication system which connects the Instructional Services Center to the entire campus enables faculty to call up films, slide series, taped experiments and demonstrations for presentation on television screens. Video tape recorders are presently used in speech, drama, police science, and dental hygiene courses to record and evaluate student performance.

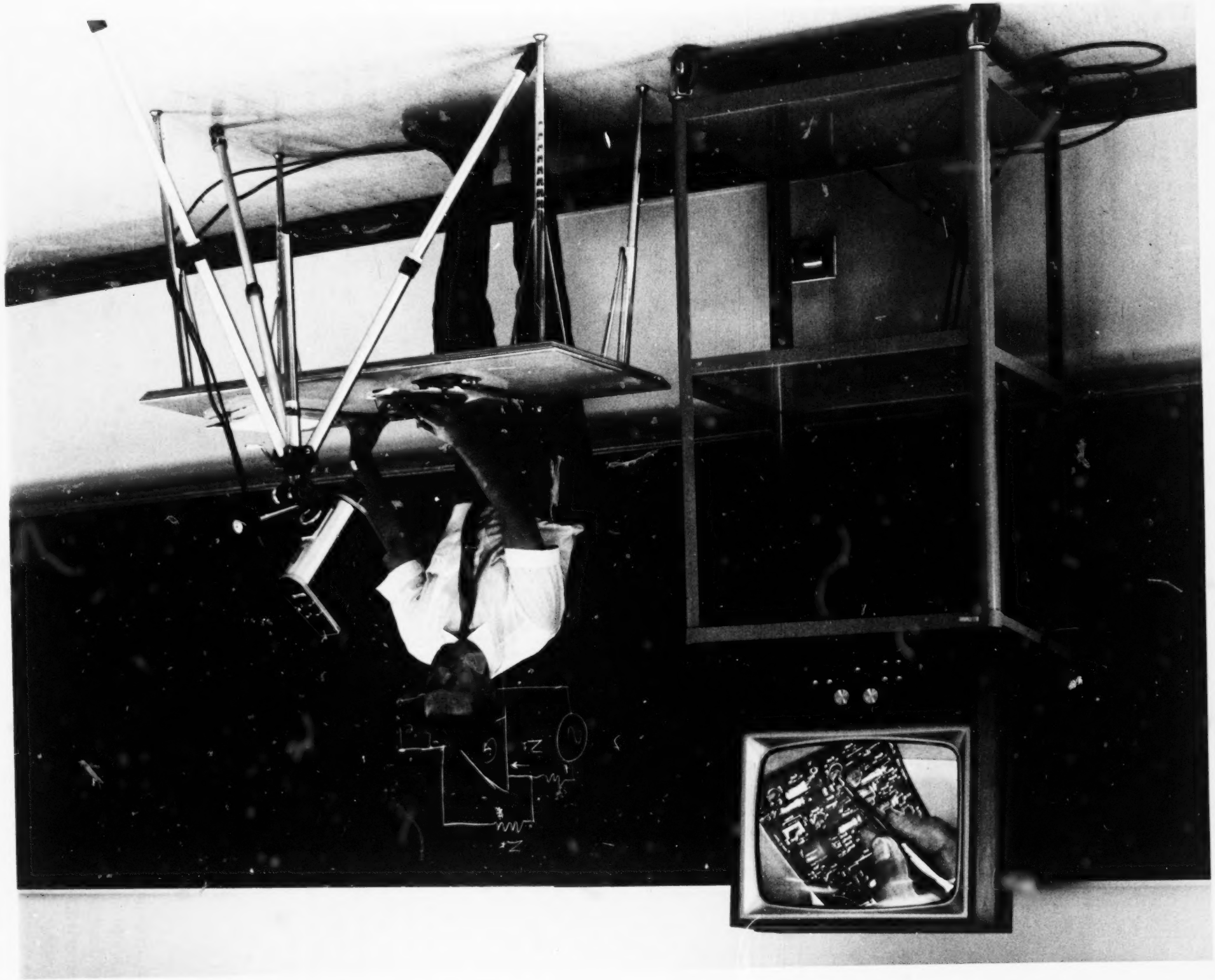
It was noted by Mr. Wetherbee that it is now possible to distribute nine programs simultaneously, but that the cost of film and video tape rental often limits the ability to meet faculty demands. Plans for expansion of the current system, therefore, call for the purchase of more software, as well as the possible addition of color to the system (especially for biology, dental hygiene, and other health sciences).

*Cost and Time Factors*

Since faculty must spend time beyond their normal responsibilities in preparing video tapes for use in class, a policy has been developed at Monroe Community College whereby instructors acting as talent retain sole right to the content of their tapes. They receive 50 percent of gross receipts obtained through distribution to colleges, other nonprofit agencies, and industry.

*Student and Faculty Reaction*

Six video-equipped modular carrels, soon to be installed in the library, will serve as an impetus toward



independent self-instruction at the Monroe campus. Through random dial-access, a student will be able to select from an entire tape the portion or portions he wishes to view. After a trial period, this project will have possibilities for extension to independent study in all subject areas.

Faculty and student acceptance of the use of this television equipment and of similar projects is gauged through formal channels of the Student Association and the Student-Faculty Senate, and more informally by written faculty evaluation of both technical quality and substance of taped programs.

*State Agency Assistance*

Mr. Wetherbee feels that the State Education Department could be of primary assistance in acting as a central source for locating video tapes, films, slides, and other software — particularly those items produced at other colleges and universities. By maintaining a master video tape library, the State could help decrease the costs of renting and purchasing commercially-produced films and could keep institutions aware of all materials available.

*Ancillary Outcomes*

Exposure to closed-circuit television in the classroom and availability of the equipment has motivated students to involve themselves in television production. One channel is now available for student broadcast of campus elections, committee meetings, and entertainment (including music, art, and athletic events).

## THE COLLEGE OF ST. ROSE

### Year: 1966 Grant Request: $1,006

*Description: Equipment and Materials for Improvement of Instruction in Social Studies*

A primary objective of the College of St. Rose is to train social studies teachers for the elementary and secondary school levels. A curriculum change effected in 1965 requires all sophomore enrolled in these programs to take at least one area studies course; this might be an area study of Latin America, Africa, the Middle or Far East. This change resulted in increased demands upon the history and political science department. It was necessary to hire additional faculty to teach new courses made necessary by this requirement and by increased enrollment in the social studies department.

Four faculty members compiled an inventory of audiovisual materials and equipment available for use by the social studies department and evaluated the needs of their respective divisions on the basis of equipment available, new courses to be offered, and their own knowledge of the most effective methods of teaching these courses. It was decided that emphasis should be on obtaining equipment and materials which would be used most effectively in teaching area studies courses.

In proposing a Title VI–A project, therefore, equipment and materials pertinent to intercultural studies were selected. The major items available to the social studies department prior to receipt of the Title VI–A grant were an opaque projector, a tape recorder, a record player, and several maps. The equipment was clearly inadequate for the department.

Funds from the 1966 Title VI–A grant made possible the purchase of additional equipment including a tape recorder, overhead projector, filmstrip and slide projectors, and a variety of materials for use in the area studies courses. Filmstrips, slides, tapes, globes, and maps were purchased to enable a greater number of students to develop a knowledge and an intelligent, critical appreciation of nonwestern cultures often neglected in the academic program. Elementary and secondary school social studies teachers are also given an opportunity to become familiar with resources available in the public schools.

Approximately 240 students benefitted directly from the purchase of this equipment in its first year of use. This number increases with each additional year of operation.

The Title VI–A project was part of a comprehensive plan for improving instruction in the social sciences. Included in the long range plan were the addition of books and recordings to the library for area studies, continuation of the practice of inviting guest speakers expert in an area of social studies, field trips to museums specializing in intercultural studies, encouragement of independent research projects, and the addition of courses such as an area study of Southeast Asia.
The goal of the long range plan at the College of St. Rose was the improvement of instruction in social studies. The 1966 Title VI–A project enabled the college to take a step toward the achievement of this goal. Efforts continue to upgrade existing courses and to expand course offerings to an increased number of students.

*College of St. Rose: Equipment and Materials for Improvement of Instruction in Social Studies*

Respondent: Sister Catherine Ryan, Chairman, Department of Social Sciences and Associate Professor of History and Political Science

*Impact of the Project*

The program for nonwestern area studies was inaugurated at the College of St. Rose in 1965. Each undergraduate is required to complete at least one semester of study on Latin America, Africa, the Middle or Far East. Sister Catherine Ryan stated that instructional equipment and materials form an integral part of the curriculum. Items purchased through the 1966 Title VI–A grant constitute the basis for a mediated approach to instruction in the social sciences.

As part of a general revision of its entire curriculum, the College is establishing an Instructional Resources Center to be housed in a separate unit of the library. Sister Ryan expects this facility to support widespread use of audiovisual resources throughout the instructional program. A group of six colleges in Northeastern New York (St. Rose, Siena, Union, Russell Sage, Rensselaer Polytechnic Institute, and Skidmore) provide the means for exchange of faculty, course offerings, and materials for the social sciences.

Opening of an Instructional Resources Center is expected to eliminate current shortcomings of the project such as lack of faculty orientation to equipment and problems of scheduling, circulation, and preparation for its use.

SOUTH WEST ASIA AND INDIA
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Dr. Hermann Haack

*Cost, Space, and Time Factors*

Use of slides, transparencies, filmstrips, tapes, and records forces the social studies faculty to devote additional time to preview and course preparation. Nevertheless, Sister Ryan is of the opinion that the educational value of these media is considerable and that faculty have developed an increased awareness of resources available to their specialty.

The addition of technology has brought about a reallocation of space for the Instructional Resources Center. As a direct result of the project, a full-time director has been designated for this installation, and plans are underway for adding technical personnel.

*Student and Faculty Reaction*

Audiovisual materials and methods have motivated students to produce their own 8 mm. films, transparencies, audio tapes, and other media for individual projects in nonwestern area studies. Student enthusiasm for mediated instruction has encouraged faculty who normally use an orthodox lecture approach to adjust their teaching to encompass audio and video resources.

*State Agency Assistance*

Areas of assistance from the State Education Department suggested by Sister Ryan for the project at St. Rose (and for projects of a similar nature) include cataloging social studies materials noncommercially produced by all institutions of higher learning in New York State, rerecording and circulating video tapes, consulting on the administrative organization and the physical design for instructional resource units, and selection of personnel to service these units.

*Ancillary Outcomes*

The equipment made available by the Title VI–A grant has affected the whole tenor of discussion on curriculum revision by The Educational Policy Council of St. Rose. Use of educational technology is now considered in the earliest stages of course development.

## HUNTER COLLEGE

Year: 1968 Grant Request: $14,513

*Description: Slides for Art History and Equipment for Studio Art*

The Title VI–A proposal of Hunter College for 1968 is a twofold one in the field of fine arts. Part one provides for equipment and materials for the art history portion of the program, while part two is a proposal for studio art equipment and materials.

Because of the visual nature of the art history program, the visual materials available for classroom use directly affect the quality of the course. It has been the practice of Hunter College to draw upon the slide collection of the Metropolitan Museum of Fine Arts for use in the classroom. However, with the increasing demand upon the Museum from other sources, it is becoming more difficult for art history faculty members at the College to arrange to have the necessary slides at the times they are required for classes.

While the slide sources are becoming less dependable, the number of students has increased and the curriculum has expanded, increasing the competition for slides. The cost of slide rental on this large scale makes the purchase of a permanent collection by the college the most practical solution to the problem.

The faculty, with the aid of two consultants in slide library systems, proposed recommendations for slide acquisition which were incorporated in the Title VI–A proposal. The major portion of the slides purchased were for improving the more advanced undergraduate courses, since the needs in introductory courses were not as immediate. Furthermore, the small collection which Hunter College did own was geared for the introductory courses. Slides were also purchased for two new courses in American art.

Since the faculty was involved in selecting the materials for this proposal, it is assured that they have been chosen to meet the specific needs of the department. The increased size of the collection has been planned to enrich the quality of instruction by increasing both the range and depth of study.

Because studio art deals primarily with works of art rather than theory, it is imperative to have adequate equipment available for production of these works. Both the application of new techniques to traditional media and the use of new materials such as steel, aluminum, and plastics had rendered the studio equipment at the college inadequate. To eliminate this deficiency, a proposal for various studio art equipment was made by the studio arts faculty. The equipment requested is designed to give students unrestricted opportunity to learn and work with all materials available to the artist today.

Saws and sanders are used in working with wood materials. Welders give the student more possibilities in working with metal. A kiln and various other equipment replaced many of the outdated and overworked items available to students prior to the Title VI–A grant.

Through the purchase of this equipment the college is better able to realize its four goals for the studio arts department:

1. to increase the student's creative power,
2. to stimulate his sensitivity to aesthetic values,
3. to reveal the possibilities and limitations of various media,
4. to develop the student's capacity for self-reliance and self-expression in relation to the concrete experience of art.

The studio arts portion of the project and the art history portion form an integrated plan for improving the instruction of art students, both through the examination and appreciation of the works of others, and through personal involvement in the creative process.

*Hunter College: Slides for Art History and Equipment for Studio Art*

Respondents: Miss Nancy Watt, Curator of Slides
Mr. Antoni H. Milkowski, Studio Art Instructor

*Impact of the Project*

This project is an integral part in the development of all art courses at Hunter College. Miss Watt pointed out that the slides now available are used in a basic art history course required of every undergraduate. Mr. Milkowski noted that the studio art equipment is competitive with contemporary art facilities at other major institutions of higher learning.

Since its inception in 1966, the project has been expanded through acquisitions of additional slides and appropriate viewing equipment. Some funds for this purpose were obtained through a Title VI–A grant funded in 1969.

*Time and Space Factors*

Rapid growth of the slide collection at Hunter College has not been matched by an increase in staff to administer the program. Thus, Miss Watt and her staff must not only carry out normal activities such as indexing, circulating, and maintaining the collection, but must also spend much time consulting with faculty and students on appropriate selection and use of the materials available. Similarly, the shortage of personnel in the studio art department is a matter of concern to Mr. Milkowski. Art studios would be open during most day and evening hours if a full-time technician were available to properly maintain this equipment and to offer instruction in its use.

*Student and Faculty Reaction*

Amassing slides of all art periods, Miss Watt reports, has promoted individual research and study by a growing number of undergraduates enrolled as art majors at Hunter College. These students, in addition to faculty of the Art Department, make recommendations for new slide acquisitions. The purchase of illuminating boards and other viewing equipment also results from faculty-student initiative.

*State Agency Assistance*

Miss Watt and Mr. Milkowski both hold the opinion that the State could serve college and university administrators by helping to determine the need for additional personnel necessitated by special funding for equipment and materials. The institution's ability to provide additional staff should be assured prior to grant approval.

*Ancillary Outcomes*

This project has had an unanticipated positive impact upon the professional stature of the Art Department at Hunter College. Both respondents agreed that the attraction of prospective faculty has been enhanced through the development of a comprehensive slide library. Likewise, the availability of modern apparatus in the art studios has improved the possibility of attracting established artists to augment the present Hunter College art faculty.

## ITHACA COLLEGE

### Year: 1969 Grant Request: $30,000

*Description: Closed-Circuit Television System*

After several requests by individual departments for closed-circuit television equipment at Ithaca College, a faculty committee was set up to determine the college's needs for such equipment and the means for meeting these needs. The college had some experience with closed-circuit television in the form of two small systems designed specifically for use in biology and speech pathology. The question arose, however, of whether the college should continue providing individual systems for use only in the specific capacity for which they were originally purchased, or should set up a campus-wide, closed-circuit television system.

The committee recommended that the college install an integrated campus-wide system which would not only meet current needs, but would also offer the flexibility and diversity necessary for further expansion. The initial cost of such a project would be greater than several individual systems, but in the long run, the campus-wide system, with its greater potential for growth, would be more economical.

In exploring the various possible uses for closed-circuit television at the college, it was found that they fell generally into three categories. First, laboratory demonstrations could be presented to a large group or several small groups simultaneously. Specific laboratory techniques which might be used in successive years could be prerecorded. A student would not lose valuable visual information by being at a distance from the demonstration table.

Second, students who are practice teaching and involved in clinical situations could use closed-circuit television for self-evaluation. Student and teacher together could analyze and criticize student techniques.

A third possibility for closed-circuit television is in the large lecture. All students are able to see what is taking place at the lecturn. A lecture hall not large enough to accommodate an entire class could be used in conjunction with other classrooms to bring a particular lecture to a large group of students. Tapes of speakers who are not available on campus might also be used to enrich classroom presentations.

A three-phase plan was decided upon to implement the project. Phase one consists of installing cable and wide-screen television monitors in three large lecture rooms and regular television monitors in 10 classrooms. It would be possible to channel four different programs to four or more classrooms at one time. Off-the-air educational televisional programming could be simultaneously channeled to classrooms and video taped. Pretaped programs could also be simultaneously re-recorded and channeled to classrooms.

Stage two consists primarily of acquiring a television mobile van for video taping lectures or other events anywhere on campus. Video tapes made on the van could later be channeled to any of the classrooms equipped with television receivers.

The third stage involves purchasing a single-camera portable television system which includes a video tape recorder. This unit would be used for video taping student-teachers and students in laboratories for later self-evaluation. The portability of this unit makes it flexible enough for use in a wide variety of situations throughout the campus.

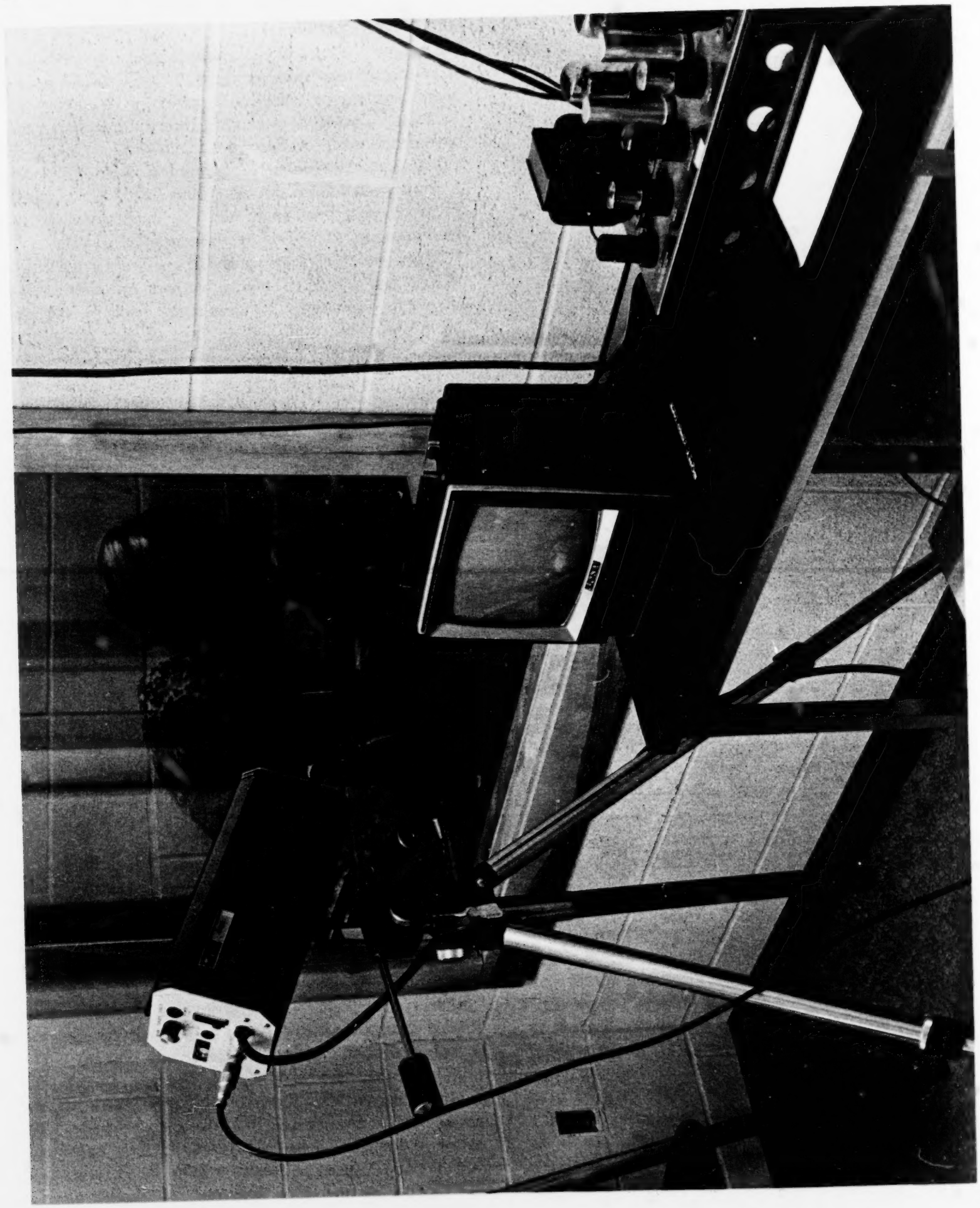
*Ithaca College: Closed-Circuit Television System*

Respondents: Dr. Stanley W. Davis, Director of Graduate Studies and Research Administration
Mrs. Gloria Mordue, Coordinator, Instructional Resources Center
Dr. Robert Davies, Provost
Dr. Louis Delanney, Chairman, Biology Department
Dr. William Bergmark, Assistant Professor of Chemistry

*Impact of Project*

This project encompasses the first phase of a plan for campus-wide use of closed-circuit television as opposed to a previously established pattern of television instruction on a department-by-department basis. In addition to the playback equipment (video tape recorders), receivers, and distribution facilities now funded, later stages of the plan include the purchase of a mobile unit for on-location recording and an additional portable television camera.

According to Mrs. Mordue the campus-wide television system is expected to improve undergraduate education at Ithaca College by exposing larger numbers of students to outstanding faculty, to special lecturers not in residence at Ithaca, to exemplary offerings available



from video tape libraries and educational television networks. Further advantages cited by Mrs. Mordue are the ability of television to magnify objects under study and to quickly demonstrate laboratory experiments which normally occur over a long period of time.

The exchange of video tapes with other institutions participating in the College Center of the Finger Lakes (Hartwick, Elmira, Alfred University, Hobart and William Smith, Keuka, Wells, Cazenovia, and Corning Community) will allow all these colleges to offer courses which have heretofore been available only on a limited basis.

Shortcomings of the television project at this stage of development, as noted by Dr. Davis, include the lack of sufficient faculty appreciation for the potential uses of the equipment and the failure to provide release time for faculty to prepare for televised instruction.

*Cost, Space, and Time Factors*

Dr. Davis expects television to decrease the cost of instruction per student at Ithaca College. Student enrollments are rising. Many faculty members are young. With achievement of tenure and advancement in position they can expect considerable increases in salary. Television, he believes, will allow growth in enrollment without a concomitant increase in faculty size. It will also permit faculty to offer a wider range of courses.

*Student and Faculty Reaction*

Student reaction to courses currently taught at the College is sought through written questionnaires. The Instructional Resources Center gauges acceptance of all audiovisual equipment through a similar technique. It is thus contemplated that televised courses will be evaluated both on procedure and content. Dr. DeLanney pointed out that students enrolled in Radio-Television and in other subject areas would be approached for criticisms on the application of television to the second discipline.

*State Agency Assistance*

Dr. Davis contended that a major service could have been rendered by the State Education Department if it had been prepared to consult on the selection of television equipment and on overall planning for the project. Another major service would be State Agency assistance in conducting inservice seminars to help educate faculty in innovative uses of television and other instructional media.

*Ancillary Outcomes*

Efforts of faculty from different departments in planning a closed-circuit television operation for the entire undergraduate body promoted creative thinking about cooperative uses of dial-access information storage and retrieval and other media systems.

## NAZARETH COLLEGE OF ROCHESTER

### Year: 1966 Grant Request: $5,296

*Description: Equipment for a Tape Recording and Listening Laboratory*

In 1966, Nazareth College proposed a Title VI–A project to provide facilities for a tape recording and listening laboratory. This proposal was the result of a cooperative effort of four departments: philosophy, foreign languages, English, and social sciences. Prior to receipt of the Title VI–A grant, the language and philosophy departments had initiated pilot programs in the use of taped lectures. These served as a guideline in planning the Title VI–A project. Weaknesses in the pilot program were pointed out and corrected in the new proposal.

Twenty-eight student booths were available in the language laboratory. Only three of these were equipped with tape recorders. Title VI–A funds enabled the college to equip the additional 25 booths with tape recorders, to add two recorders at the teacher station, and to expand the tape library.

The additional student stations provide an increased number of students an opportunity to compare their responses with the correct ones on the master tape during individual study. The two recorders at the console provide additional program sources so that part of a laboratory group may do scheduled work while the other part studies independently. Students can also prepare their own tapes for teacher evaluation.

The tape recording and listening station for use by the other three departments are located in the library. A four-station deck-type player with headsets for 10 students is located in the library for individual study. A fifth tape playing unit is connected with a speaker in an adjacent room to permit small group listening.

The library units permit professors to assign lectures to students via tapes and then to arrange for more student-teacher contact hours in small discussion groups. Enrichment of standard courses is also possible through taped lectures by outstanding professors or specialists in particular subject areas.

Approximately 500 students in foreign language courses benefitted in the first semester following the installation of the equipment. An additional 1800 students in the three other subject areas use the equipment in the library.

Nazareth College was able to add a new dimension to classroom presentations and discussion. By assigning taped lectures, professors are freed for small group discussion and individual student contact. Students are able to concentrate on areas in which they are particularly interested or need additional work. The teacher is also able to select his time for taping and to make revisions to provide the best possible lecture. The pilot program stimulated student use of the equipment, and faculty involvement in the project has been instrumental in eliminating deficiencies in the four subject areas.

*Nazareth College of Rochester: Equipment for a Tape Recording and Listening Laboratory*

Respondent: Mrs. Svetlana Shales, Instructor Modern Foreign Languages

*Impact of the Project*

The 1966 Title VI–A project at Nazareth College involved the improvement of an existing language laboratory through the addition of two sound channels to bring the total to four, and the inclusion of recording facilities at student stations. Playback equipment at four student stations located in the library, three turntables, and additions to the audio tape collection are part of a continuing design for individual study at Nazareth.

Mrs. Shales pointed out that there is still a need for additional audio-active student stations in the language laboratory because of growing enrollments in modern foreign language courses. Present use of the equipment might be improved by better soundproofing between stations, the addition of technical staff to maintain equipment, and opening laboratory during unassigned class hours.

Nazareth has cooperated with St. John Fisher and the University of Rochester in using the language laboratory. The MLA Language Proficiency Test is administered with these laboratory facilities to students who have not yet matriculated in modern foreign language programs.

*Cost and Time Factors*

Mrs. Shales noted that no release time is provided for faculty members using the audio equipment. Thus it is necessary for them to spend time beyond their regular course responsibilities to audit and select commercially

produced tapes. Extensive local production of audio tapes has not been feasible because of burdensome time commitments already experienced by faculty.

*Student and Faculty Reaction*

The availability of the language laboratory and student listening stations in the library enables faculty to assign independent study projects for both remedial and advanced work. Tapes of well known works in modern foreign languages, as well as recorded contributions of experts in the fields of anthropology, sociology, philosophy, English, and other disciplines, have been acquired under this project. The selection of future tapes is determined by faculty and student usage of current audio materials. An account of such usage is derived periodically from circulation files maintained in the library.

*State Agency Assistance*

Mrs. Shales held that the State Education Department could provide valuable assistance in further development of the project at Nazareth by furnishing the College with information on similar programs in the State. She was also of the opinion that publication of a directory of audio tapes produced at colleges and universities would be an important contribution to foreign language instruction in laboratory settings.

*Ancillary Outcomes*

The laboratory facilities lend themselves to teaching language fundamentals in a programmed format. It was found that introduction of this instructional mode at Nazareth freed the instructor for work with individual students. Continued use of this method may further decrease faculty time required for classroom preparation.

## STATE UNIVERSITY OF NEW YORK AGRICULTURAL AND TECHNICAL COLLEGE AT ALFRED

Year: 1967 Grant Request: $42,211

*Description: Equipment for Laboratories and Lecture Demonstrations in Chemistry, Physics, and Mathematics*

The State University of New York Agricultural and Technical College at Alfred was hampered in its mathematics, chemistry, and physics departments by a lack of adequate equipment for instrument analysis, lecture demonstrations, and laboratory experiments. Faculty, as well as students, recognized the need for additional equipment. Faculty stressed that it is impossible to give a realistic picture of an industrial situation without adequate equipment. It is important that students who, upon graduation take positions in laboratories, hospitals, industry, and research organizations, be familiar with the precision instruments which they encounter in these jobs.

In planning for improved chemistry instruction, a variety of instruments that have application to the work of various types of laboratories were purchased with a Title VI–A grant in 1967. An infrared spectrophotometer is used in general and organic chemistry laboratories to provide experience in applied quantum mechanics and in the identification of organic substances. Two differential scanning calorimeters are used to analyze substances via thermal properties and to evaluate graphic data obtained from these experiments. A modular instrument assembly, designed for use in student laboratories, provides a variety of precision analytical instruments. Modules can be studied individually or can be interconnected to form a variety of complete instruments.

The physics department selected demonstration and laboratory equipment for the study of radioisotopes. An oscilloscope is used in conjunction with a spectrometer and other equipment for the detection and measurement of decay particle energies. No similar precision instrument was available at the college at the time of the 1967 proposal.

The mathematics department requested several films, a projector, and teaching machine for the illustration of abstract mathematical concepts. Four calculators now permit students to solve problems rapidly which were at one time prohibitive because of the time element involved.

All faculty members who use the equipment were included in its selection. The faculty is involved in a continuing program of professional improvement. In the use of new items, instructors are helped to adapt the equipment to their particular courses and laboratories for optimum use.

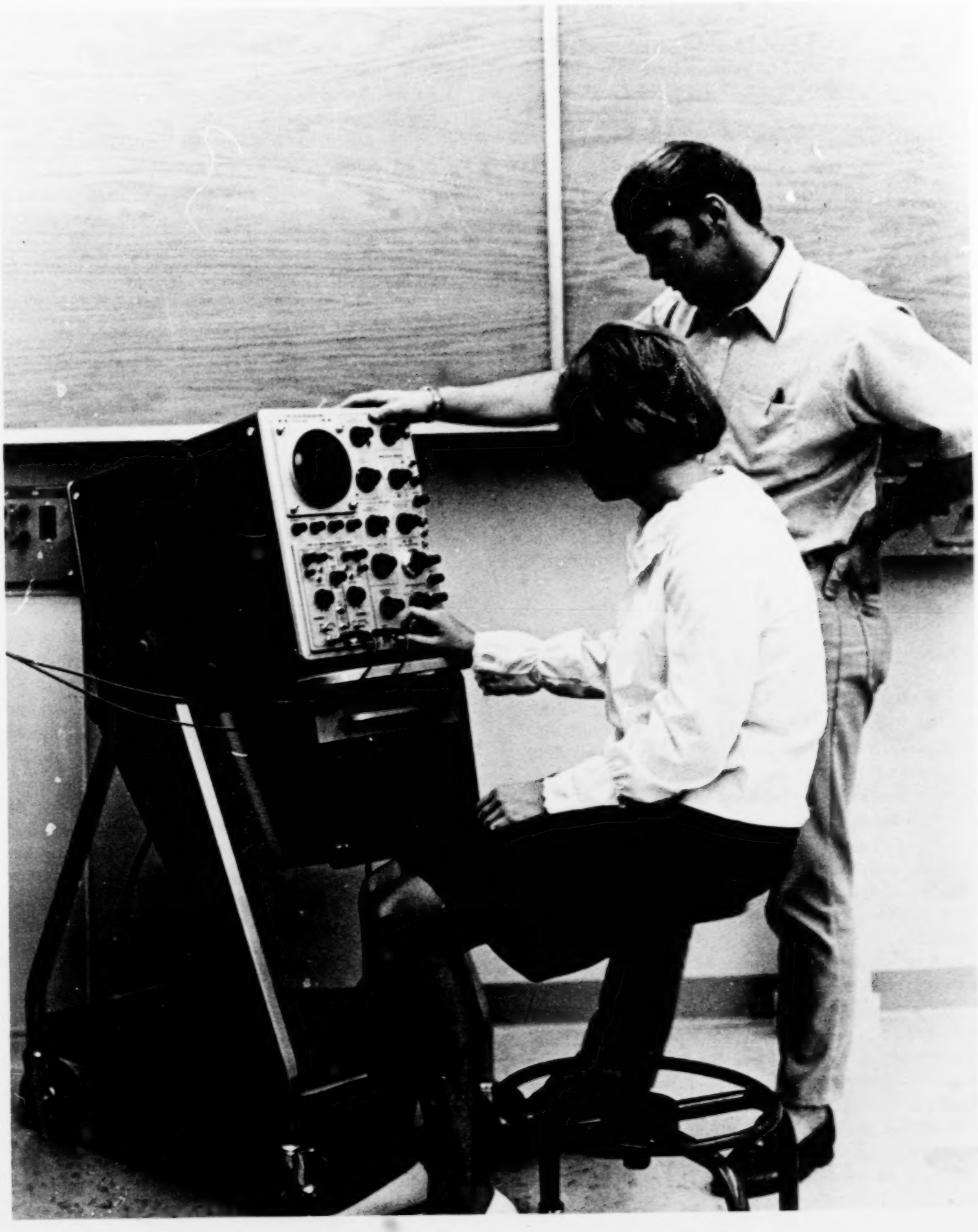
*State University of New York Agricultural and Technical College at Alfred: Equipment for Laboratories and Lecture Demonstrations in Chemistry, Physics, and Mathematics*

Respondents: Dr. Milo Van Hall, Dean of Planning and Development
Prof. Walter Lang, Chairman, Physics Department
Prof. Walter Schogoleff, Chairman, Chemistry Department
Prof. Lauren Soule, Chairman, Mathematics Department

*Impact of the Project*

Chemical technology is a major area of study at the College, whereas physics and mathematics are supporting areas for the Engineering Science curriculum. To meet the requirements of a spiraling enrollment and rapid growth in scientific knowledge, each of these concentrations has added extensively to its stock of laboratory equipment since 1966.

Professor Schogoleff reported that the purchase of spectrophotometers, calorimeters, Mettler balances, and a gas chromatograph allows chemistry students to analyze various instrumentation used in industrial laboratories as well as to make qualitative and quantitative analysis on a variety of chemical compounds. With regard to physics, Professor Lang indicated that acquisition of a gamma scintillation spectrometer, oscilloscopes, stroboscopes, and scaler-ratemeters provides the student with a complement of equipment necessary to study the effects of atomic radiation. As detailed by Professor Soule, the addition of calculators, films, and teaching machines to the mathematics laboratory has promoted an approach to individual study for students enrolled in this discipline. This method of instruction has been particularly effective with individuals who have suffered cultural deprivation both in urban and rural settings.



Shortcomings of the project cited jointly by respondents concern procedures for obtaining grants under the Title VI--A program. Specifically, they objected to changes in application instructions without sufficient notice, and to the time and detail for completing necessary forms.

*Cost and Time Factors*

Respondents from each subject area included in the application indicated that additional faculty time is required for maintaining and using the new apparatus. This could be partially alleviated by hiring a technical assistant to service all three laboratory areas.

*Student and Faculty Reaction*

Availability of the equipment purchased with Title VI–A funds has moved instruction from the theoretical level to that of practical application. Discussion of radioactive isotopes is now reinforced with direct student experience in their use. Similarly, demonstrations by instructors with analytical instruments is followed by student participation in laboratory experimentation. These changes have resulted from consultation with alumni and with members of special advisory committees formed to improve instruction in each of the affected disciplines.

*State Agency Assistance*

Respondents asked that the State Education Department provide a clearinghouse for information on innovative projects using educational technology similar to that now in operation at their institution. They further suggested that both Federal and State funding for improvement of undergraduate instruction through purchase of equipment and materials should cover at least a 3-year period. The first year is envisioned as a pilot phase for such projects. This, they contended, would result in more efficient and effective use of resources available to institutions of higher learning.

*Ancillary Outcomes*

Results of this project, not fully anticipated at its inception, include laboratory work carried on by students independent of classroom assignments, expanded employment opportunities for graduates who have operated the new equipment, and the proposed development of a curriculum dealing with the control of air and water pollution.

## STATE UNIVERSITY OF NEW YORK AT ALBANY

Year: 1967 Grant Request: $39,350
($28,000 of this amount was used for the Student Response System)

*Description: Student Response System for a Multimedia Classroom*

In most large lectures there is little opportunity for two-way communication between lecturer and students. Accordingly, the lecturer receives no feedback and is, therefore, unable to judge whether the material is being comprehended or if there is need for further explanation or more detailed examples. Ideally, a teacher should have some immediate information about whether or not the class is understanding the material being presented. In a small class this is not a great problem, since conversation is possible; with increasing student enrollments, however, the trend has been toward large lectures.

Recognizing this problem, the State University of New York at Albany, proposed, in 1967, a project which allows a professor in a large lecture hall to receive immediate feedback from a portion of the class or from the entire class. This is accomplished by a system in which each student has a response mechanism, usually a multiple-choice, pushbutton mechanism.

The instructor can sample feedback in a variety of ways. Group data may be obtained through electrical meters which indicate the proportion of students making each choice. A lecturer may also obtain a cumulative display of the total number of correct responses made by an individual in a class period. Magnetic tapes and punch cards may be incorporated for a permanent record of responses. It is also possible for the student to receive immediate feedback on how well he is responding to questions.

The student response system was installed in one lecture hall at the university. Each lecturer who teaches in this hall has the apparatus available to him so that he is able to pace his material according to student response, and so that students are aware of their need for supplementary explanations of certain concepts. Assuming that each class scheduled for this lecture hall uses the equipment to capacity, 800 students per week can benefit from the use of the student response system.

Faculty who initially used the student response system were trained intensively in its operation. This core of faculty now serves as a resource group for instructing others in the use of the equipment. The core group also meets to discuss various ways in which the equipment is used and to discuss possible innovations for its future development.

*State University of New York at Albany: Student Response System for a Multimedia Classroom*

Respondent: Dr. Murray G. Phillips, Associate Professor of Education

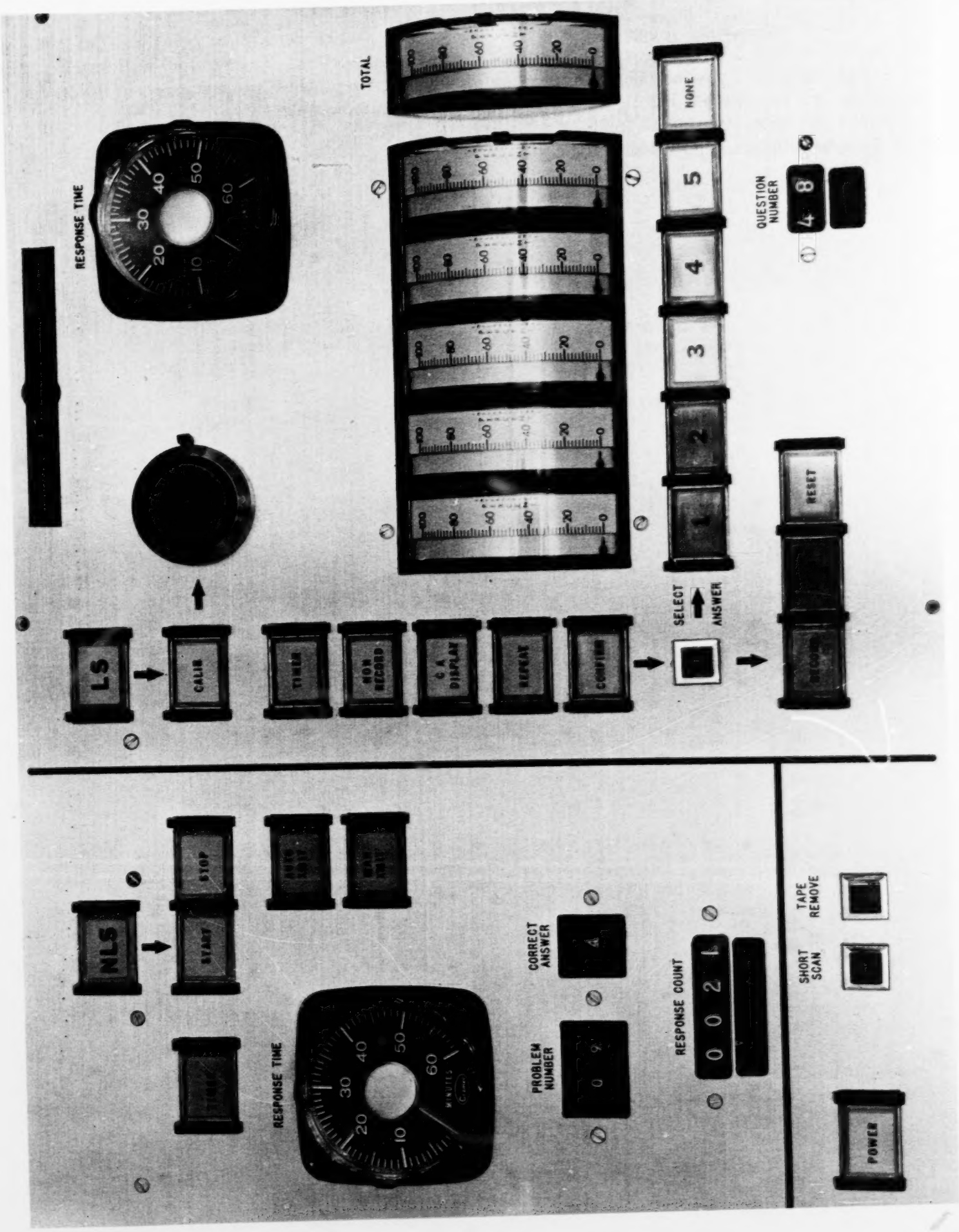
*Impact of the Project*

Dr. Phillips expressed the belief that the Student Response System is a component of a long range plan to improve curriculum and evaluate media produced for use in the classroom. The system has a capacity for expansion to 250 student stations. This expansion may occur after an adequate testing period of the present equipment. It is also conceivable that individual study carrels located in the library, dormitories, and instructional areas will be incorporated into the system. Thus, individualization of instruction may be a major contribution of the project. Dr. Phillips believes that the installation has potential for humanizing instruction through modern technology, particularly in a large university.

*Cost, Space, and Time Factors*

As with many modern technological systems, it is necessary for faculty members to spend additional time preparing classroom presentations. This released time becomes costly to the institution in that it is necessary to hire faculty of equal competence to take over the teaching responsibilities of those working with the Student Response System. Dr. Phillips pointed out that time spent by faculty members related to instructional improvement should be equated with that spent in basic scholarly research and publication.

Reassignment of staff from several departments may be necessary to promote a team approach to utilization of the Student Response System, computer assisted instruction, and similar systems. It is likely that faculty from the School of Education who provide the academic program in educational communications will receive joint appointments with the University Center for Educational Communications.


RESPONSE TIME
TOTAL
QUESTION NUMBER
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C A DISPLAY
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NLS
START
STOP
RESPONSE TIME
CORRECT ANSWER
PROBLEM NUMBER
RESPONSE COUNT
SHORT SCAN
TAPE REMOVE
POWER

*Student and Faculty Reaction*

Since the system has been in full operation only since April 1969, Dr. Phillips has been the only one to seek feedback from students. This has been done on an informal basis and reaction has been generally favorable. Regular provisions for student feedback will be made as the system becomes more widely used.

*Ancillary Outcomes*

The physics department has found an unexpected use for the system as a laboratory instrument in demonstrating the principle of randomness in the Second Law of Thermodynamics.

## STATE UNIVERSITY OF NEW YORK COLLEGE AT BUFFALO

Year: 1969 Grant Request: $4,986

*Descriptions: Equipment for Students in Teacher Education Programs To Create and Develop Instructional Materials*

The Communication Center at the State University of New York College at Buffalo is at the center of the main academic area. Its large lecture halls are designed and equipped for multimedia use, while other areas in the complex are used for the preparation, preview, and distribution of media. At present, however, equipment available for preparation of media is primarily used for photography courses, public information, and other administrative purposes.

Students in teacher preparation courses particularly feel the need to have equipment available to them on a continuous basis for the preparation of classroom instructional materials. This deficiency has been identified through continuous evaluation processes by both faculty and students. A project was therefore proposed to provide equipment which would be available to these student-teachers so that they might become familiar with the preparation and utilization of instructional materials which will be available to them in the elementary and secondary schools where they will eventually be teaching.

Faculty, too, have found it difficult to schedule time to use the equipment for preparing lecture material because of inadequate equipment. Some materials are produced for the faculty by the Instructional Resources Division, but these could be supplemented by materials prepared by the instructors if they had the equipment available to them.

A plan for instruction in the use of the equipment is detailed in the project outline. Students in media courses will be selected to produce 8mm film loops on various procedures used in the preparation of slides and transparencies and in the untilization of various kinds of instructional equipment. In this way students will gain experience in the preparation of film loops and these film loops will be available for self-instruction at the convenience of anyone desiring to produce instructional materials. Pressure will be reduced on an understaffed department by decreasing the time necessary to instruct faculty and students in the use of equipment.

A well trained core of faculty and staff is available to implement the plan. Facilities in the new Communication Center offer possibilities for broadly expanded, multimedia utilization. The proposal will insure the availability of equipment on a continuing basis in order that instructional media of high quality may be prepared by faculty for use in lectures, and so that students in teacher education programs may learn the techniques of preparation and effective selection and presentation of materials.

*State University of New York College at Buffalo: Equipment for Students in Teacher Education Programs To Create and Develop Instructional Materials*

Respondent: Dr. H. Gene Steffen, Director Instructional Resources Division

*Impact of the Project*

Self-instruction has emerged as a major pattern of education at the State University College at Buffalo in recent years. Eight mm film loops are used to express core concepts of disciplines taking advantage of this approach to instruction. Augmenting the single concept film loops are other media including transparencies, slides, audio and video tapes.

Dr. Steffen was of the opinion that the impetus for mediated self-instruction resulted from the design of independent learning sequences developed for students enrolled in media courses. Its acceptance has spread to other academic areas such as teacher education (particularly teachers of exceptional children), music, art, foreign languages, and the physical sciences. Faculty endorsement has been limited only by the availability of software. Dr. Steffen believes that development of local, large-scale production of 8mm film loops will lead to extension of the self-instruction mode to all academic departments within the college. He further held that his Division has the capacity to serve as a fountainhead for production and distribution of educational film for the instructional resource centers in the western New York region.

The uncertainty of continuing funds for the purchase of raw film stock was a principal shortcoming of the project as noted by Dr. Steffen. He further expressed

a conviction that funds of the type provided by Title VI–A should be available on at least a 3-year basis with the first year serving as a pilot project. This would promote more accurate determination of desirable changes in the project and actual requirements for locally produced material as opposed to those which are commercially available.

*Time, Space, and Cost Factors*

Mediated self-instruction is expected to result in a savings in instructional costs because faculty will be freed from commitments to large-group instruction, thus affording them the opportunity to extend course offerings. No additional production areas are required, but a reallocation of instructional space may be expected. In place of large-group lecture halls, mediated self-instruction calls for individual study carrels which can be located in lounges, seminar rooms, libraries, and dormitories or wherever students might congregate.

*Student and Faculty Reaction*

Self-instruction, using programmed sequences of 8mm single concept film loops and supporting media, is changing student learning at the College from the orthodox lecture-recitation-examination format. Especially benefitted are those students who are directly involved in the production of film loops. They are required to make an intense analysis of the subject matter with which they are dealing by defining their own instructional objectives. Thus, student involvement in the development of filmed instruction, as well as student use of these films, provides additional incentive for learning.

Student and faculty reaction to the project is gauged through multiple-choice answers which are recorded on IBM cards and evaluated electronically. Response patterns thus obtained will influence changes in direction for the project.

*State Agency Assistance*

The State Education Department could eliminate unnecessary duplication of effort in projects of this type by maintaining a record of media-related activities at all institutions of higher education in New York State. This record should describe in detail the types of educational innovation undertaken at various public and private colleges and universities, including equipment specifications and staffing requirements.

*Ancillary Outcomes*

An anticipated ancillary outcome of this project was brought forth by Dr. Steffen. A change in the pattern of elementary and secondary education may be effected by teachers whose own preparation has benefitted from self-instruction and the use of media related to this method of learning.

## STATE UNIVERSITY OF NEW YORK COLLEGE AT FREDONIA

### Year: 1968 Grant Request: $47,359

*Description: Establishment of a Dial Access Information Retrieval System and Purchase of Materials and Audiovisual Equipment for the Instructional Resources Center*

The 1968 Title VI–A project of the State University of New York College at Fredonia resulted directly from requests by faculty. A prototype multimedia independent laboratory was established in the academic year 1966–67 to serve the entire campus. Since that time several satellites of the Instructional Resources Center have been put into operation at various locations on the campus. In establishing the Center, plans were made for major expansion of the use of media to meet future needs. The 1968 project composes a part of this expansion.

With the Title VI–A grant, the college was able to establish a dial-access system for increased use of independent study. Sixty student stations, located in the multimedia independent learning laboratory, the music and education libraries, and in learning spaces in selected dormitories were put into operation.

The stations are designed to utilize tape-slide units and slide, filmstrip or 8 mm. film projectors depending upon the needs of the student. In addition to the dial-access programs, tapes used less frequently are available with cartridge tape recorders at student stations in areas where major utilization occurs. Remedial and advanced work as well as regular class assignments can be done in the independent study carrels, facilitating instructional efficiency and effectiveness.

Large group instruction was not ignored in the Fredonia proposal. With the increase in enrollment, an increase in large group instruction was inevitable. Equipment and materials were inadequate for large lectures at the time of the 1968 Title VI–A application. The proposal included requests for 16 mm. projectors, slide projectors, tape recorders, and software to be used with this equipment. Six large multimedia classrooms in the Communications Center provide an ideal setting for the use of this equipment.

The Instructional Resources Center staff meets continually with faculty members on both a formal and informal basis to discuss current needs and to plan for the increased use of media. Several members of the faculty serve as liaisons between individual departments and the Center staff. The college-wide Advisory Committee on Instructional Services assists the Center in all matters related to instructional innovation and experimentation. The equipment for the Title VI–A proposal was selected to meet specific needs and an attempt was made to select only equipment which will not become obsolete within the foreseeable future.

*State University of New York College at Fredonia: Establishment of a Dial-Access Information Retrieval System and Purchase of Materials and Audiovisual Equipment for the Instructional Resources Center*

Respondent: Dr. Robert M. Diamond, Director Instructional Resources Center

Dr. Diamond reported that there is a campus-wide effort at Fredonia toward structured independent study to put more responsibility for learning on the student and to take him out of the confines of the traditional classroom. The fundamental objective of this plan was to make the most effective use of student and faculty time.

A major component of the structured individual study approach is a 58 station dial-access information retrieval system. At present there are 20 stations in a special laboratory devoted to individual study, with the remaining stations dispersed in small groups in the music building and in approximately 10 dormitories. Dr. Diamond expects to add dial-access units as new living quarters become available.

The mechanism for exchange of tapes, slides, films, filmstrips, and other materials used for independent study exists through the organization of the Western Regional Instructional Resource Centers of the State University. In addition to Fredonia, centers included in this group are located at Brockport, Geneseo, Alfred, Buffalo State, and the University of Buffalo.

Shortcomings of the project cited by Dr. Diamond centered principally on the failure of either State or Federal funding to provide staff to operate and otherwise manage the use of instructional equipment. He was also of the opinion that grants should be made for at least a 3-year period and that the application procedure should be simplified.

*Cost, Space and Time Factors*

The structured independent learning program is expected to eventually decreased instructional costs at Fredonia. This will come about, Dr. Diamond stated, because a larger number of students will be reached with the same course content. Mediated instruction will, at the same time, encourage faculty to develop the necessary software and will afford greater contact between faculty and students. More efficient use of current facilities will be made because considerable quantities of information traditionally taught in laboratory settings will be presented through a variety of media in individual learning spaces.

*Student and Faculty Reaction*

The primary objective of this project was to key student learning patterns to a structured independent study format. Achievements and shortcomings of this endeavor as they pertain to each of the many participating disciplines (including music, education, the social and physical sciences) are determined from responses to opinionaires circulated periodically to faculty and students. Further means of measuring acceptance of the independent study approach include, where applicable, the extent to which stated behavioral objectives have been reached and the use of programmed materials resulting solely from student initiative.

*State Agency Assistance*

Dr. Diamond recommended that the State Education Department offer assistance to colleges and universities in the following areas:

Dissemination of research findings on innovative approaches to instruction in higher education.
Securing staff to support these innovative projects.
Encouraging commercial development of instructional materials for specialized academic areas.
Funding for applied research in instructional technology.
Inservice education of college faculty in the uses of instructional technology.

## SUFFOLK COUNTY COMMUNITY COLLEGE

### Year: 1966 Grant Request: $12,279

*Description: Expansion of a Language Laboratory*

A language laboratory was established at Suffolk County Community College in 1965. After 1 year of laboratory operation, it was determined that to make full use of the facilities, student recorders must be installed.

Since students were not able to record and listen to their own voices, they did not have adequate practice in detecting their own errors. Additional playback facilities were also needed to serve the increasing enrollment in language courses.

The 1966 Title VI-A grant enabled the college to equip 35 student stations with recording equipment. Playback facilities were also increased from 80 to 115. The 1966 grant provided the equipment necessary to complete the third step of a four-step plan for the language laboratory.

Films, filmstrips, slides, and maps were also purchased to provide instructional improvement in languages. Audio programs including tapes and discs were included in the proposal. A tape duplicating system makes these audio programs available to an increased number of students. In the first term after installation of the equipment, 1440 students made use of the language laboratory.

Faculty members participated in the selection of the equipment and continue to make recommendations for innovation and improvement in academic programs. In addition, all language instructors are trained in the techniques of the language laboratory and are active in developing policies, materials, and methods for its use.

*Suffolk County Community College: Expansion of a Language Laboratory*

Respondents:
- Dr. Albert M. Ammerman, President
- Mr. Andrew Murray, Director of the Language Laboratory
- Mr. George Spaw, Head of the Language Department
- Mrs. Liliane Thurau, Assistant Professor of Foreign Languages

*Impact of the Project*

Suffolk County Community College began operation in 1960. Dr. Ammerman reported that the laboratory was conceived at that time as a means for teaching modern foreign languages through an audio-lingual approach as opposed to traditional instruction with printed texts. It is anticipated that the current 35 station facility will be expanded by at least 50 percent and that a second classroom may be utilized as a language laboratory. Mr. Murray, Laboratory Director, indicated that the current operation is not adequate to meet the needs of 1400 users per semester.

With additional listening stations available, operation of the laboratory will be stratified by student level. Beginning language students would be in a lockstep mode using a single, taped lesson, whereas the more advanced students would be able to select from a library of tapes.

An Instructional Resources Center is being developed within the library. Within 5 years, this facility will be equipped with student carrels featuring both audio and video components. In the interim, faculty are relying on 16 mm. films to provide visual support for some audio tapes currently in use. Locally produced language tapes are exchanged with Dowling College, the State University of New York College at Stony Brook and Nassau Community College to the mutual benefit of all participating institutions.

*Student and Faculty Reaction*

The language laboratory serves as reinforcement to classroom instruction in modern foreign languages and for the Speech and Theatre concentration (radio announcing, diction, remedial speech, music, and drama). Instructors relieved from activities related to rote learning are able to give attention to the needs of individual students.

Student feedback on laboratory programming is obtained through weekly assignment and comment sheets. The suggestions obtained in this manner serve as a basis for many of the locally produced tapes.

*State Agency Assistance*

The desirability of assistance from the State Education Department in planning for language laboratories and other innovations was strongly emphasized by Mr. Murray. He asked that consultation be provided on equipment specifications and on identifying personnel capable of making adequate selection and use of instructional materials. Particularly in regard to tape recording and play-back facilities, Mr. Murray called

for designation of a consultative team consisting of a technician, a language specialist, and a communications administrator. He suggested also that the State Education Department sponsor symposia on language laboratories and other educational technology of interest to colleges and universities in New York State.

*Ancillary Outcomes*

Mr. Spaw, Head of the Language Department, and Mrs. Thurau, Assistant Professor of Language, related unexpected and extensive influences of the audio-lingual approach upon the teaching of modern foreign languages at Suffolk County Community College. Classroom instruction now focuses on exposition and synthesis as opposed to rote learning. New faculty are appointed on criteria other than ability to manage traditional language drill. (Folk music, poetry, and other expressions of foreign cultures thus become integral parts of course content.) Finally, selection of texts is greatly affected by the extent to which they lend themselves to integration with laboratory instruction.

## NEW YORK INSTITUTE OF TECHNOLOGY — OLD WESTBURY CAMPUS

Year: 1966 Grant Request: $49,715

*Description: Laboratory and Audiovisual Equipment for the Improvement of Instruction in the Physical Sciences, Biological Sciences, and Engineering*

The science and engineering departments have experienced a steady growth since the opening of the Old Westbury Campus of the New York Institute of Technology in the fall of 1964. With the aid of Title VI-A funds in 1966, a concentrated effort toward excellence in undergraduate instruction in these subject areas has been made. The plan for improvement revolves around four major objectives:

1. Inclusion of lecture demonstrations in freshman courses
2. Expansion and refinement of laboratory experiments in all courses
3. Introduction of new courses
4. Addition of laboratories and special laboratory equipment

Since the various departments within the science and engineering disciplines varied widely in their needs, each department described separate deficiencies to be remedied, and each proposed particular methods for overcoming these deficiencies.

The Department of Life Sciences is responsible for overseeing the science survey courses and the general chemistry course at the Institute. In 1965, the two survey courses consisted strictly of 3 lecture hours per week supplemented by a few movies. Demonstrations were kept at a minimum because of the lack of adequate equipment. It was decided that until it would be feasible to add a laboratory section to these survey courses, the existing shortcomings could be ameliorated through the inclusion of meaningful demonstrations during lectures. The equipment selected for a Title VI-A proposal was, therefore, chosen with the intent of illustrating lectures to help the student more readily understand the principles being taught.

The proposal includes models and equipment to demonstrate static electricity, currents and magnetic fields, light and wave motion, atomic behavior, and cell theory, to name only a few.

There was no independent chemistry department at the Old Westbury Campus in 1965; chemistry was offered in the biology laboratory as a review course for a few weeks. This proved insufficient for students majoring in biology and biomedical engineering.

Considerable upgrading of the existing laboratory facilities was necessary to meet the need for a two-semester course in chemistry. This upgrading was accomplished by purchasing various laboratory equipment. Twenty-four student laboratory stations were installed. Analytical balances, chromatography equipment, spectrophotometers, and a radioactivity lab system were included. Concurrent with these acquisitions, several faculty members were developing a curriculum for a major in chemistry.

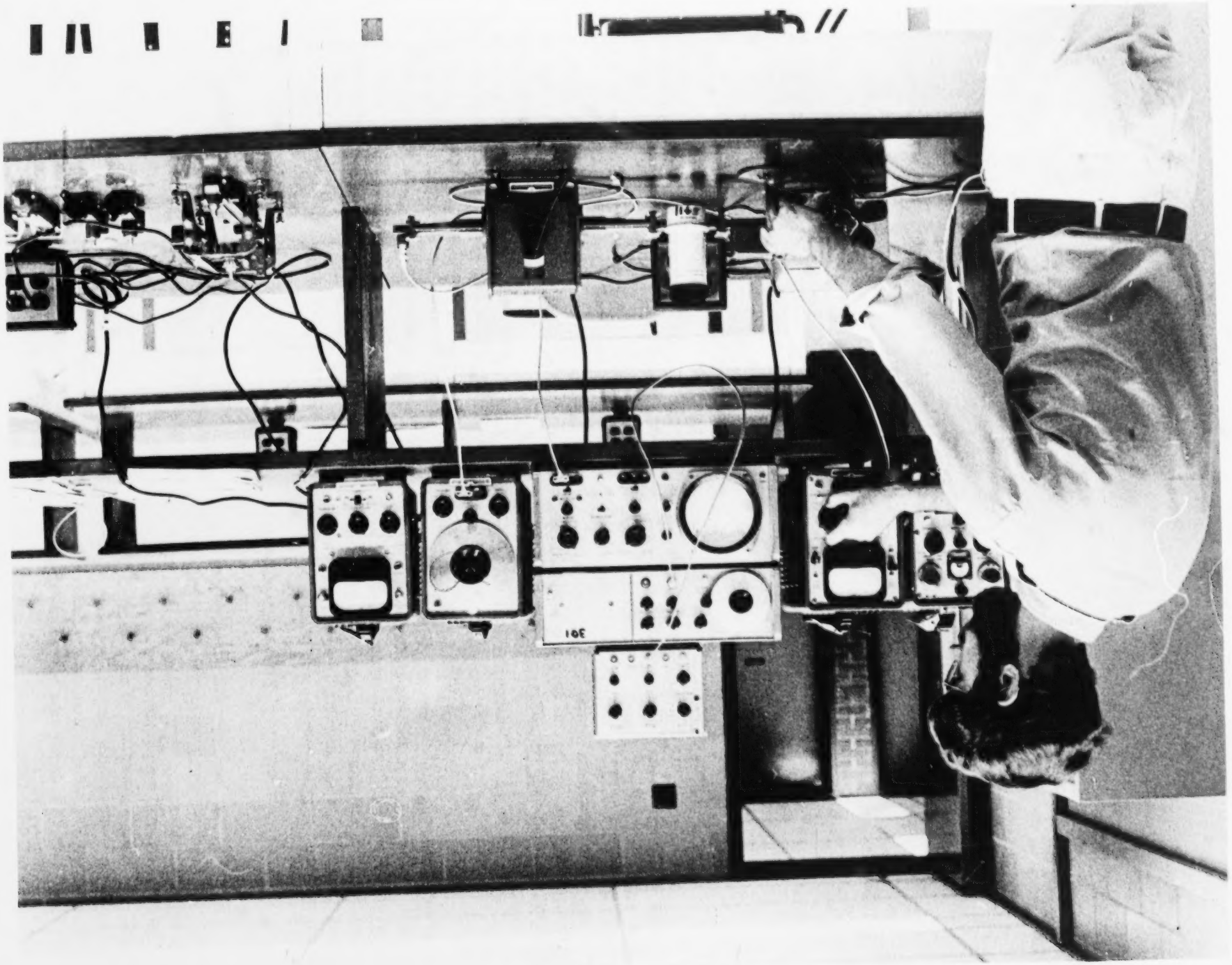
The computer technology program at Old Westbury was, in 1965, deficient in that it had no training devices available for student use. The three courses offered were given only as classroom lectures. A full-scale computer was the ideal choice for improving instruction. This was ruled out, however, since its use could be diverted to fields other than undergraduate education.

A training device was selected in which all components of operation are accessible and visible. The internal computing system is capable of illustrating all basic principles of machine logic and the relevant circuitry. The equipment offers good simulation for teaching the elements of computer operation.

The electrical technology department had a problem similar to those of the life sciences and computer technology departments. Laboratory equipment was not adequate for the number of students enrolled in the electrical machinery and microwave and UHF communication systems courses. Students were working in teams of three or four to perform experiments.

To remedy this situation, five universal laboratory machines and five microwave demonstration kits were required. The purchase of these machines reduced the number of students per team to two, increased the number of experiments possible, and made feasible the performance of more sophisticated laboratory work. A greater degree of coordination between lecture and laboratory is now possible.

With the aid of the Title VI-A grant in 1966 and in 3 subsequent years, the college continues to upgrade instruction to meet the needs of increased enrollment.



*New York Institute of Technology — Old Westbury Campus: Laboratory and Audiovisual Equipment for the Improvement of Instruction in the Physical Sciences, Biological Sciences, and Engineering*

Respondents: Dr. Israel Bar-Gadda, Chairman, Science and Technology
Dr. William Smith, Dean of Instruction
Dr. Theodore Steele, Vice President for Academic Affairs

*Impact of the Project*

According to Dr. Bar-Gadda, the equipment available for student use in chemistry, electrical, mechanical, and computer technology at the Institute in 1965 was almost nonexistent. The 1966 Title VI-A grant, therefore, provided many of the items essential to the operation of these laboratories at a minimal level. The purchase of Universal Laboratory Machines, a Fabri-Tek Computer Trainer, and several microwave kits gave students an opportunity for practical application of theoretical principles.

Dr. Bar-Gadda suggested that award of Federal and State grants should be based on individual departmental needs, rather than on an overall judgment of the institution. Such factors as number of square feet available per student and the condition of equipment currently in use should be considered.

*Cost, Space, and Time Factors*

With increased equipment and facilities available, students spend additional time in laboratory sessions. This increase in student contact hours defrays costs for the Institute through increased tuition for additional course work. Time lost to both instructors and students in moving equipment from storage places to the laboratory has been eliminated by placing the new items in the areas where they will most often be used.

*Student and Faculty Reaction*

The equipment chosen by New York Institute of Technology was selected for its application to practical industrial situations. This enhances the possibilities for students to engage in meaningful individual projects. The availability of equipment in the biology laboratory has resulted in an unanticipated number of student transfers to that department.

*State Agency Assistance*

Dr. Bar-Gadda suggested that the State Education Department could be of valuable assistance to colleges and universities in acting as an impartial aide in the selection of appropriate equipment for undergraduate use. A center for information on innovative uses of equipment and materials throughout New York should be maintained by the Department.

# STATISTICAL ANALYSIS

The first graph illustrates differences between requests from institutions of higher education and funds available to these institutions during 4 years of the Title VI-A program in New York State. Top portions of the graph represent amounts by which requests exceeded funds available for each year. Beneath the columns are actual figures for annual requests and available funds .

Title VI-A funds allotted to this State were relatively stable over the course of the program. They decreased slightly during the second and third years, then increased slightly for Federal fiscal year 1969. Requests, on the other hand, rose rapidly during the second and third years, but fell off considerably for the fourth (and final) year.

The decline in requests may have been a natural consequence of demand becoming adjusted to supply. That is, it may have resulted from the disappointment of some institutions over their failure to secure Title VI-A grants and from an earlier intensification of competition for the limited moneys available. There is, however, no evidence to negate the belief that a substantial increase in Title VI-A funds would have led to corresponding growth of amounts requested from this program for the improvement of undergraduate instruction in New York State.

" Number of Students To Benefit " refers to the number of undergraduates expected to enroll in courses using equipment and materials obtained through Title VI-A grants (during the fall term after the acquisition of said equipment and materials is completed).

Examination of Graph II indicates that the total number of *additional* students who would have benefitted (321,006) if all Title VI-A requests had been funded is proportionately much less than the total number of students who actually did benefit (862,765) as a result of this program. The explanation is found in the State of New York Plan for Title VI-A: Applications showing numbers of students to benefit in the top 5 percent received 20 points, those in the next highest 5 percent obtained 19 points, and so on, with just one point awarded to those with the smallest numbers to benefit.

Though consistent with Federal Regulations, the State criterion on numbers of students to benefit — which accounts for 20 of 100 possible points awarded — clearly favors large projects in large institutions as opposed to projects which, regardless of merit, involve relatively few students or which are undertaken by colleges or universities with limited undergraduate enrollments. It is recommended that future programs established for purposes similar to Title VI-A (grants for equipment and materials to improve undergraduate instruction) should include ground rules which provide for competition among institutions of similar size.

The delineation of cost per student by subject area is a partial but, nonetheless, useful indicator of the impact of Title VI-A projects upon undergraduate instruction. As illustrated in the third graph, per student costs for five areas and the average cost per student are as follows: Physical Sciences and Engineering = $18.60; English and the Humanities = $7.38; Social Sciences = $6.16; Closed Circuit Instructional Television = $4.71; Campus-wide = $2.66; Average (All Areas = $5.38. " Campus-wide " is defined as general use of equipment and materials which are applied to several subject areas, such as through an audiovisual center.

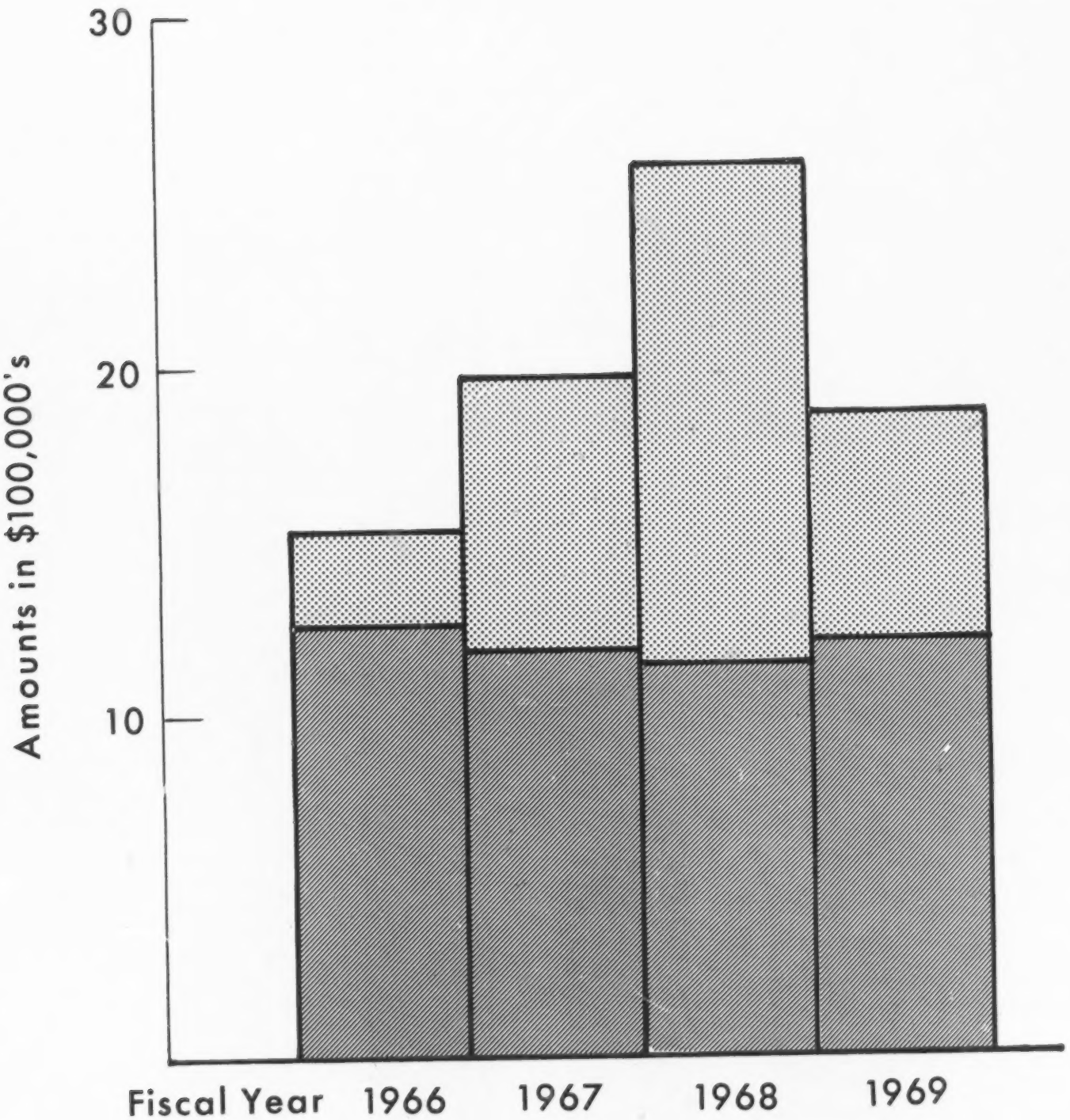
The dollar amounts listed were determined by dividing the total number of students to benefit in a subject area, over 4 years of the Title VI-A program, by the total cost of all grants in the subject area for the same period. Thus, the $1,841,329 which benefitted 98,979 undergraduates in physical science and engineering courses resulted in a per-student cost seven times greater than the cost per student of campus-wide projects, which amounted to $1,427,807 and benefitted 535,990 undergraduates.

Differences such as those just discussed are best understood in terms of the typical projects involved. Grants for the physical sciences and engineering were often applied to the purchase of a few costly and intricate laboratory items which could be used safely and accurately by a relatively limited number of advanced undergraduates. Campus-wide projects, on the other hand, usually called for a variety of audiovisual equipment and materials with an appeal for several disciplines.

Attention must be called to the fact that per-student costs are limited to the Federal share (50 percent or less) of all Title VI-A projects. The actual average cost per student, therefore, is at least double the amount reported. However, this figure does not reflect long-term use of equipment and materials funded under Title VI-A. If such use is taken into consideration, and the total number of students to benefit were computed, the average cost per student would be appreciably less than reported in Graph III.

Graph IV focuses on the distribution of Title VI-A funds from 1966 through 1969 to the State University, the City University, and private institutions of higher learning. Trends over the 4 years are readily discernible. The share of funds obtained by private colleges and universities dropped from nearly $970,000 (or 78 percent of the total) in 1966 to just over $520,000 (or 45 percent of the total) in 1969. Conversely, the share

# Graph I
## Title VI-A Funds Requested vs. Funds Available
## 1966 -69



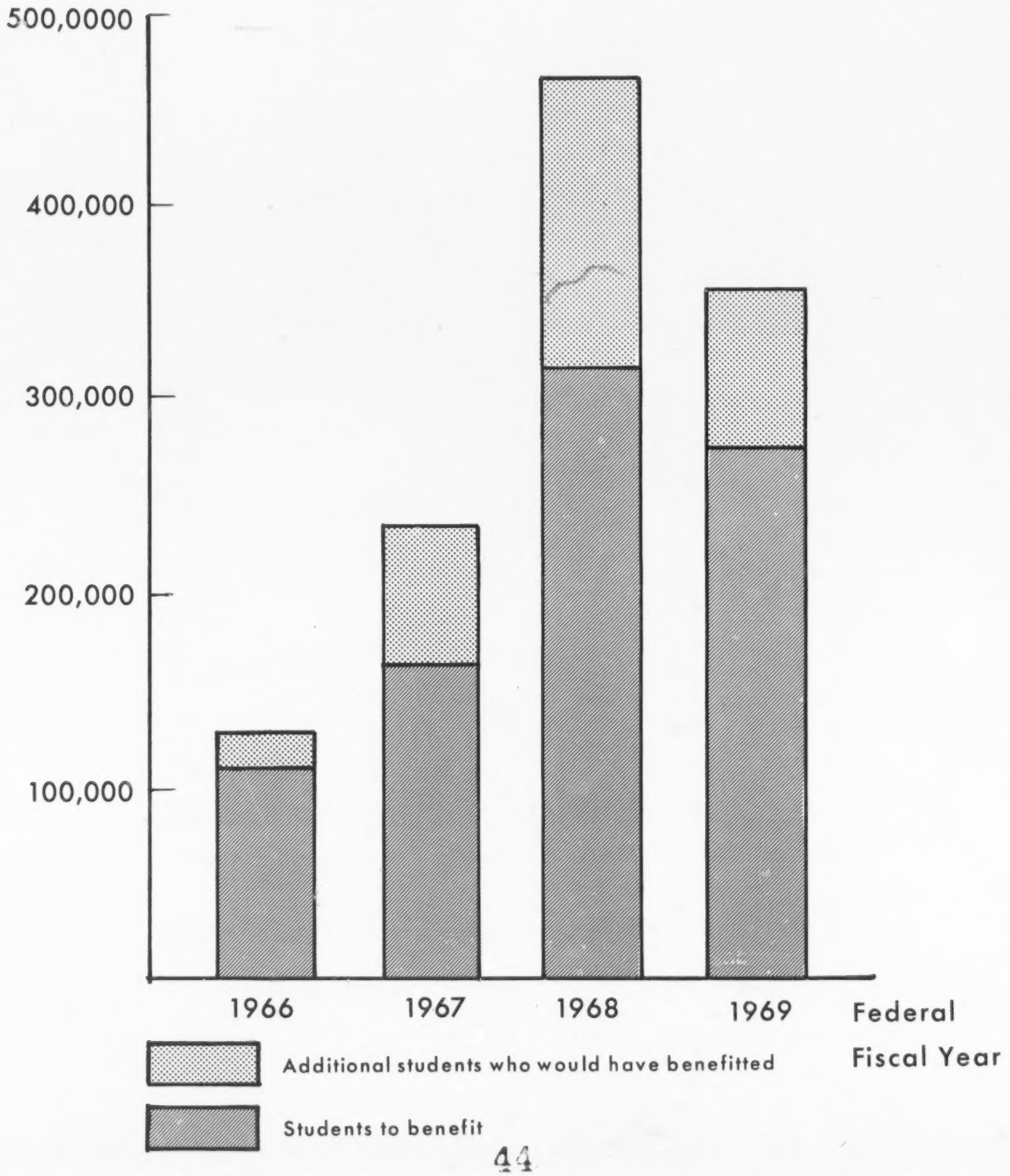

| | 1966 | 1967 | 1968 | 1969 |
|---|---|---|---|---|
| Requested | $1,500,343 | 1,962,650 | 2,562,791 | 1,844,385 |
| Available | $1,236,157 | 1,160,697 | 1,131,523 | 1,170,283 |

Requested $7,870,169

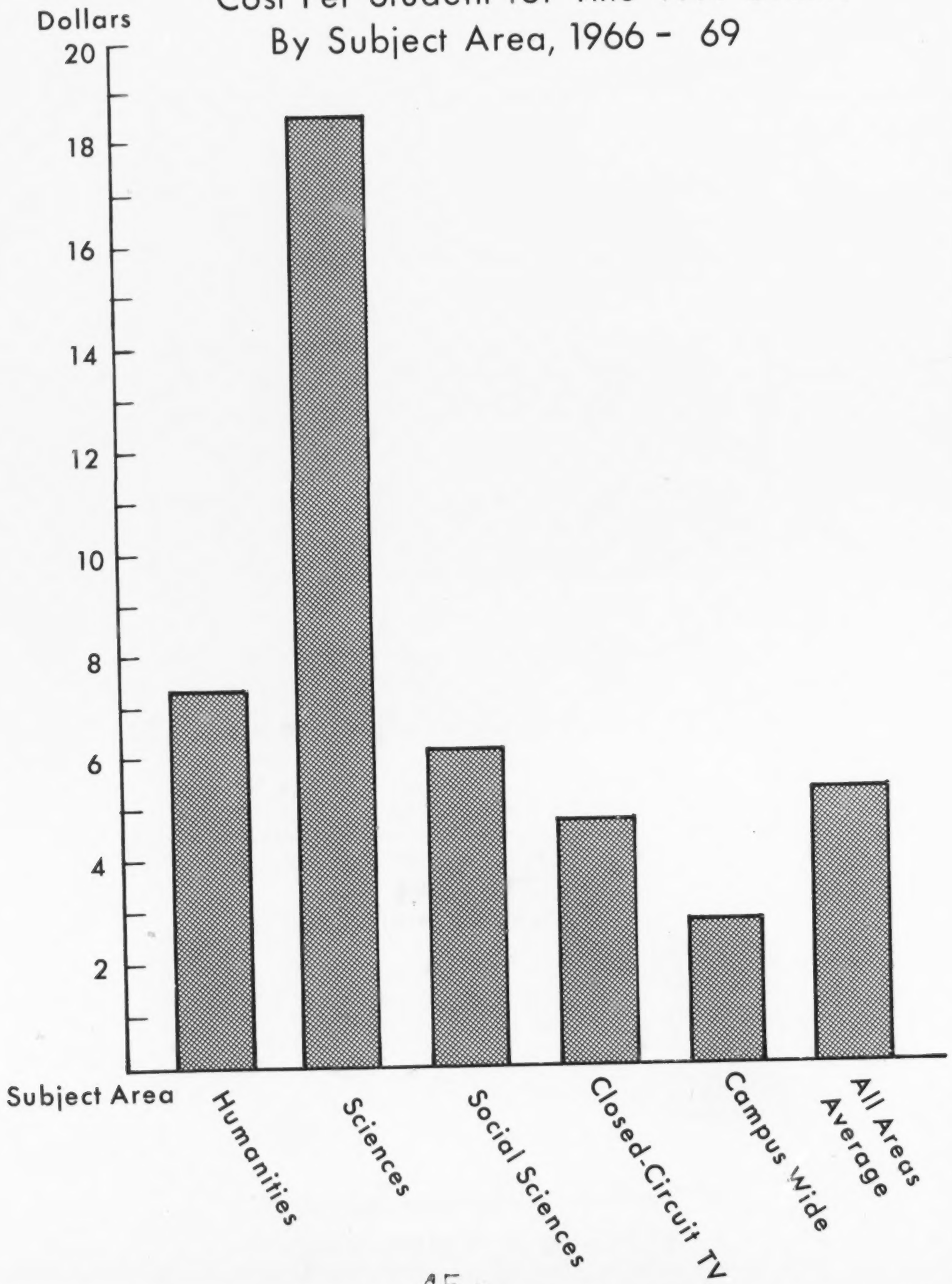
Available $4,698,660

# Graph II

## Number of Students to Benefit, and Number of Students Who would have Benefitted if all Title VI-A Requests had been Fulfilled, 1966-69

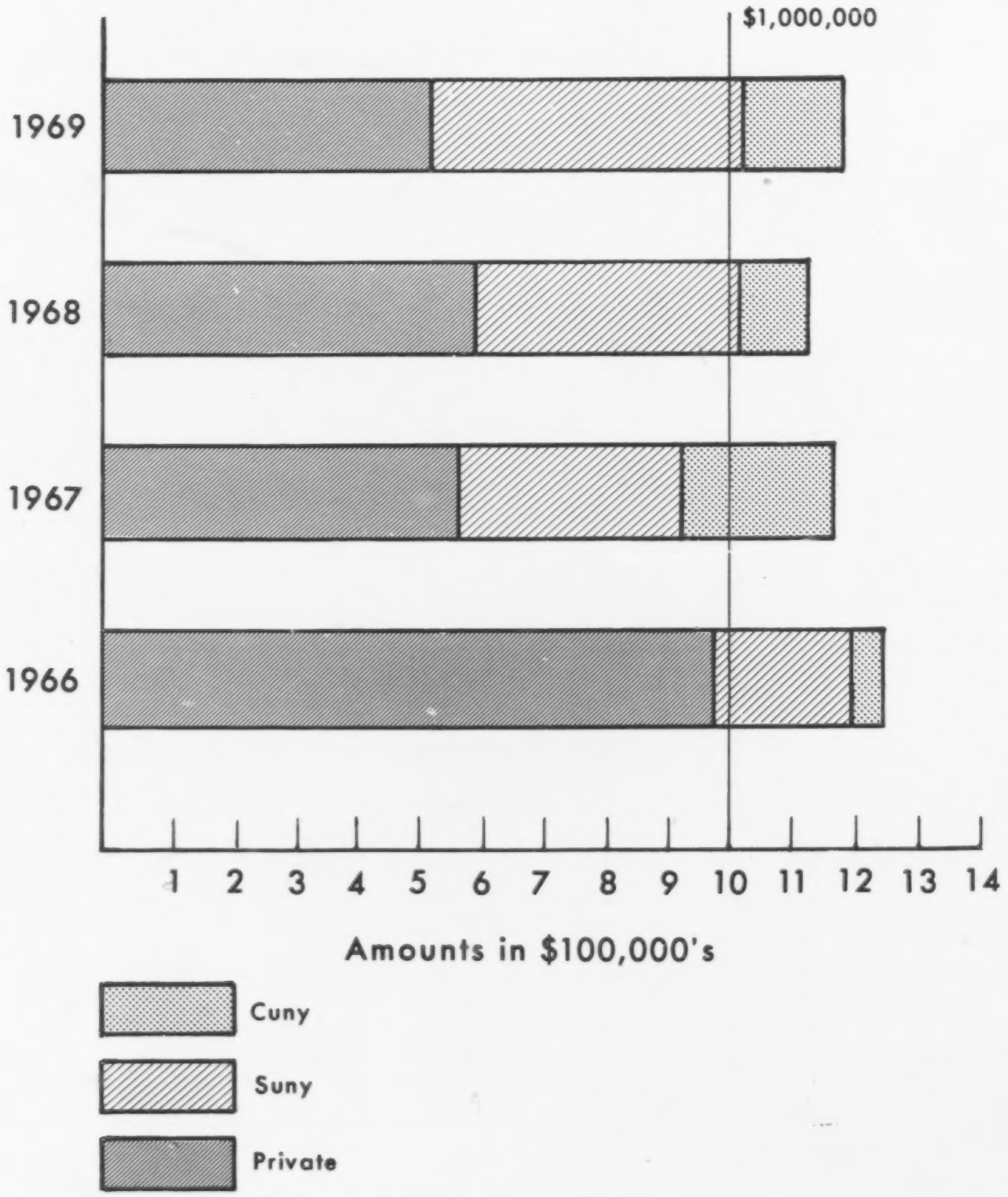


# Graph III
## Cost Per Student for Title VI-A Grants By Subject Area, 1966 - 69



# Graph IV

## Title VI-A Grants to State University, City University, and Private Institutions, 1966 - 69 *




* Community Colleges Outside New York City Are Subsumed Under the State University.

of funds received by units of the State University increased from less than $220,000 (or 18 percent of the total) in 1966 to almost $500,000 (or 43 percent of the total) in 1969. The total of $4,698,660 granted to colleges and universities in New York State during the Title VI-A program was distributed as follows: $1,498,708 (32 percent) to the State University, $564,789 (12 percent) to the City University, and $2,635,163 (56 percent) to private institutions.

The shift in funding from private to public centers of higher education may be partly explained in terms of the criterion pertaining to numbers of students to benefit and to selected Federal criteria. The large-enrollment, large-institution bias inherent in the criterion for numbers of students to benefit is discussed in the narrative to Graph II. It must be pointed out that the increase of undergraduate enrollment in public institutions (211,000 to 269,000) far exceeded the increase in undergraduate enrollment in private institutions (190,000 to 206,000) for the 4 years covered by the Title VI-A program.

Community colleges outside New York City were, for purposes of this report, included with the State University. Compared with other institutions, these 2-year colleges spend less per student credit hour and have fewer square feet of instructional space per student. The Federal criteria favor these institutions because, in the first instance, a maximum 25 of 100 points possible are awarded to institutions with the lowest per-student expenditures. In the second case, a maximum of 10 points are awarded to institutions with the least instructional space per student.

A total of 862,765 undergraduates benefitted from the Title VI-A program in New York State. A breakdown of this total is illustrated in Graph VI: 332,725 students (39 percent) were enrolled in the State University; 132,758 (15 percent) in the City University; and 397,282 (46 percent) in private colleges and universities. (Reference to Graph VII indicates that the percentage of students who benefitted in each group of institutions very closely approximates the average share of undergraduate enrollments at these institutions.)

Graph V shows that 116 of 193 applications submitted (60 percent) by public colleges and universities were funded, whereas private institutions secured grants for 183 of 370 applications submitted (49 percent). Dividing the combined number of students to benefit in the State University and the City University (465,483) by 116, the average number of undergraduates who benefitted from Title VI-A programs in the public institutions is shown to be 3,142 per application. The 397,282 total for students who benefitted in nonpublic institutions, when divided by 183, results in an average per application of 2,171. Taken together, data from Graphs V and VI appear to show an emphasis for the Title VI-A program in New York State upon numbers of students benefitted rather than numbers of institutions served.

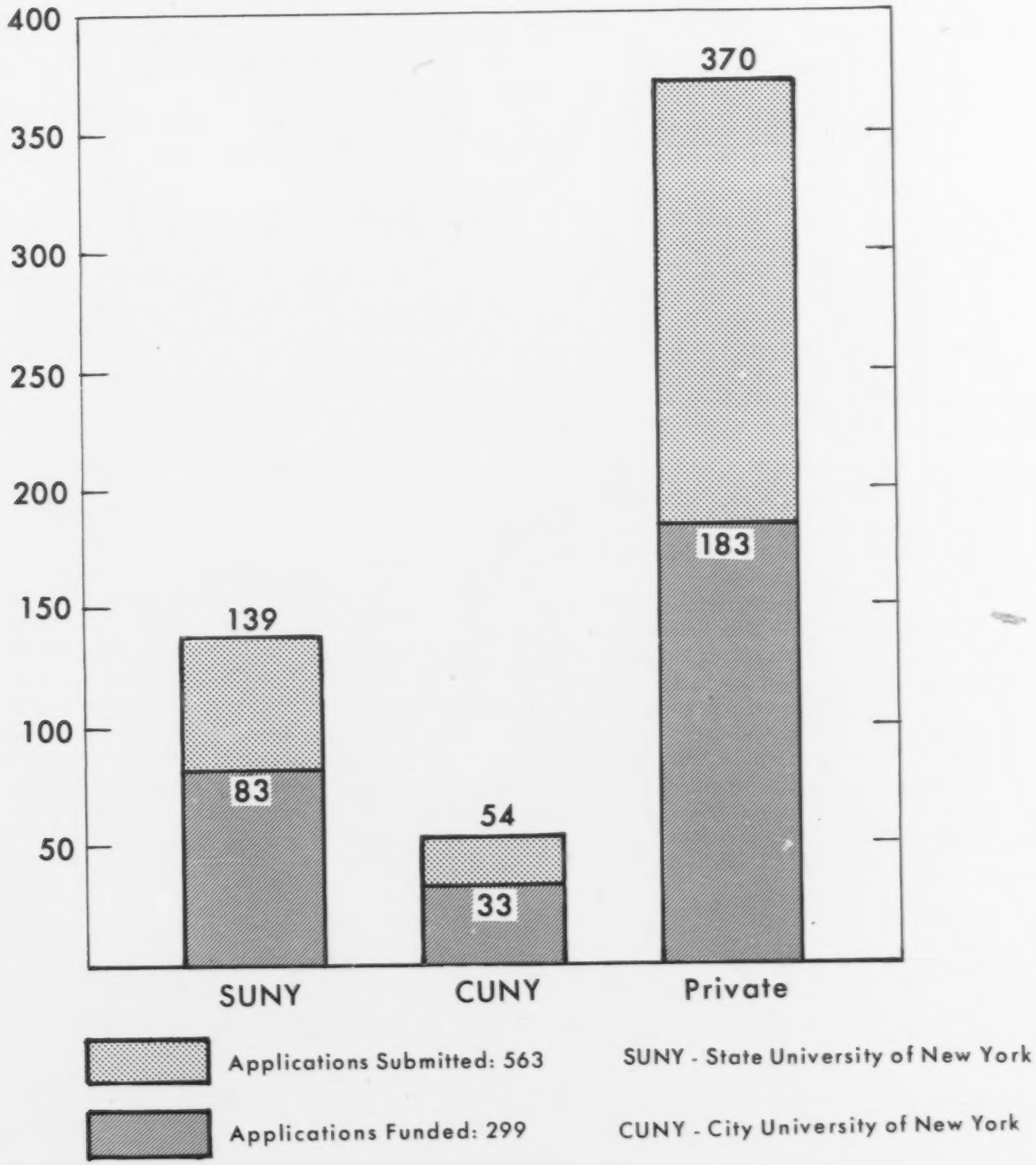
The final graph offers a comparison among undergraduate enrollments in the State University, the City University, and private institutions and the respective shares of Title VI-A funds obtained by these groups of colleges and universities. Enrollment figures used are averages for the term of the Title VI-A program, i.e., 1966–69.

It is immediately evident that, in terms of its undergraduate enrollment, the group of private institutions received a disproportionately large share of the total Title VI-A funds available. However, a review of Graph IV shows that the annual trend in funding was in the opposite direction; it favored public institutions.

The advantage in total funds distributed was gained by private colleges and universities when they captured 78 percent of Title VI-A funds available in 1966. An accounting of the exceptional performance by these institutions during the program's first year requires reference to Graphs I and V. The former indicates that 1966 was the year of least competition for Title VI-A grants; the latter shows that (on the basis of numbers of applications submitted) private colleges and universities compete with much greater intensity than their public counterparts. Of 183 Title VI-A grants made to nonpublic institutions, 71 were funded in 1966.

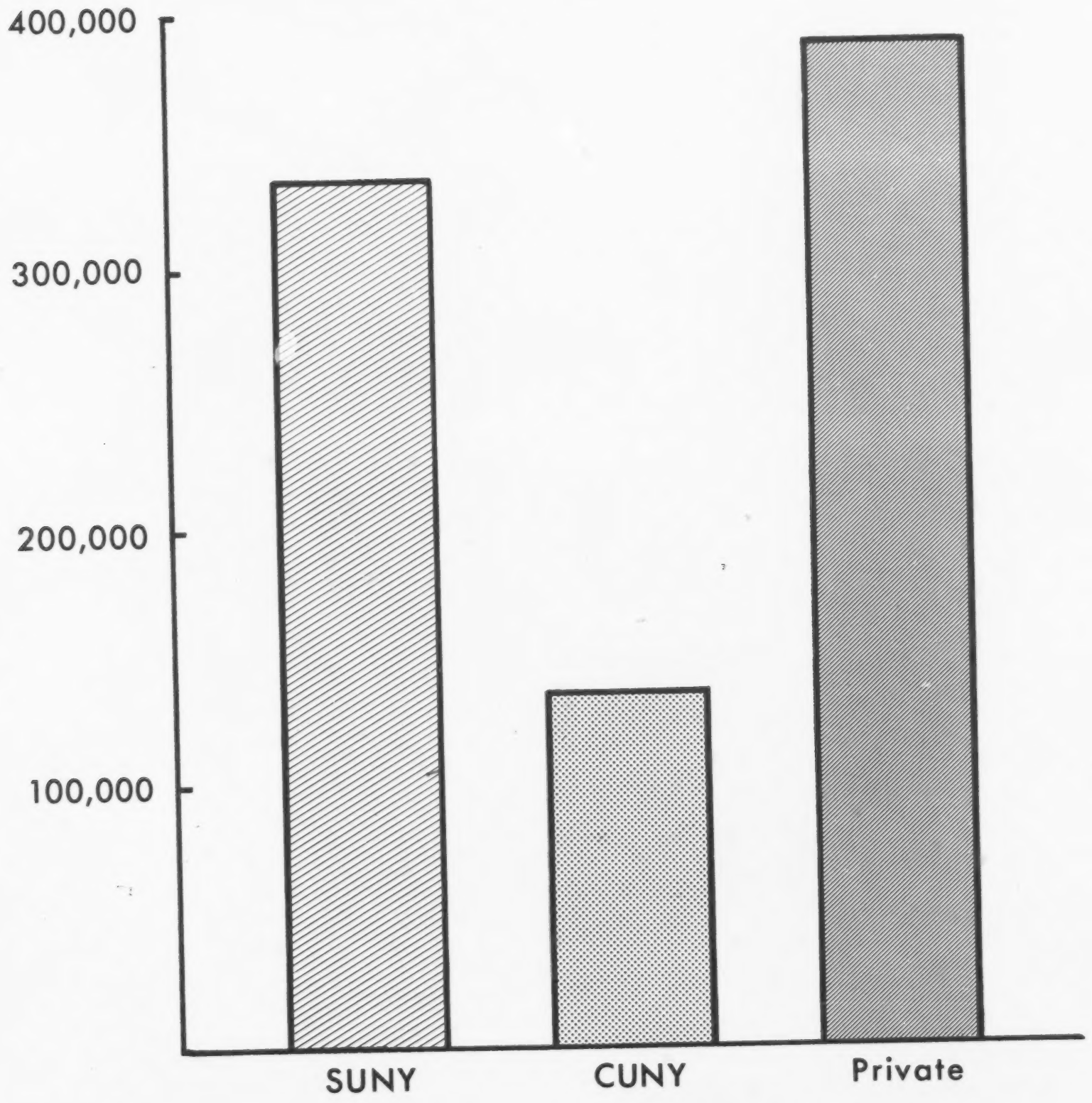
# Graph V

## Total Number of Applications Submitted vs. Total Number of Applications Funded for Title VI-A, 1966 - 69



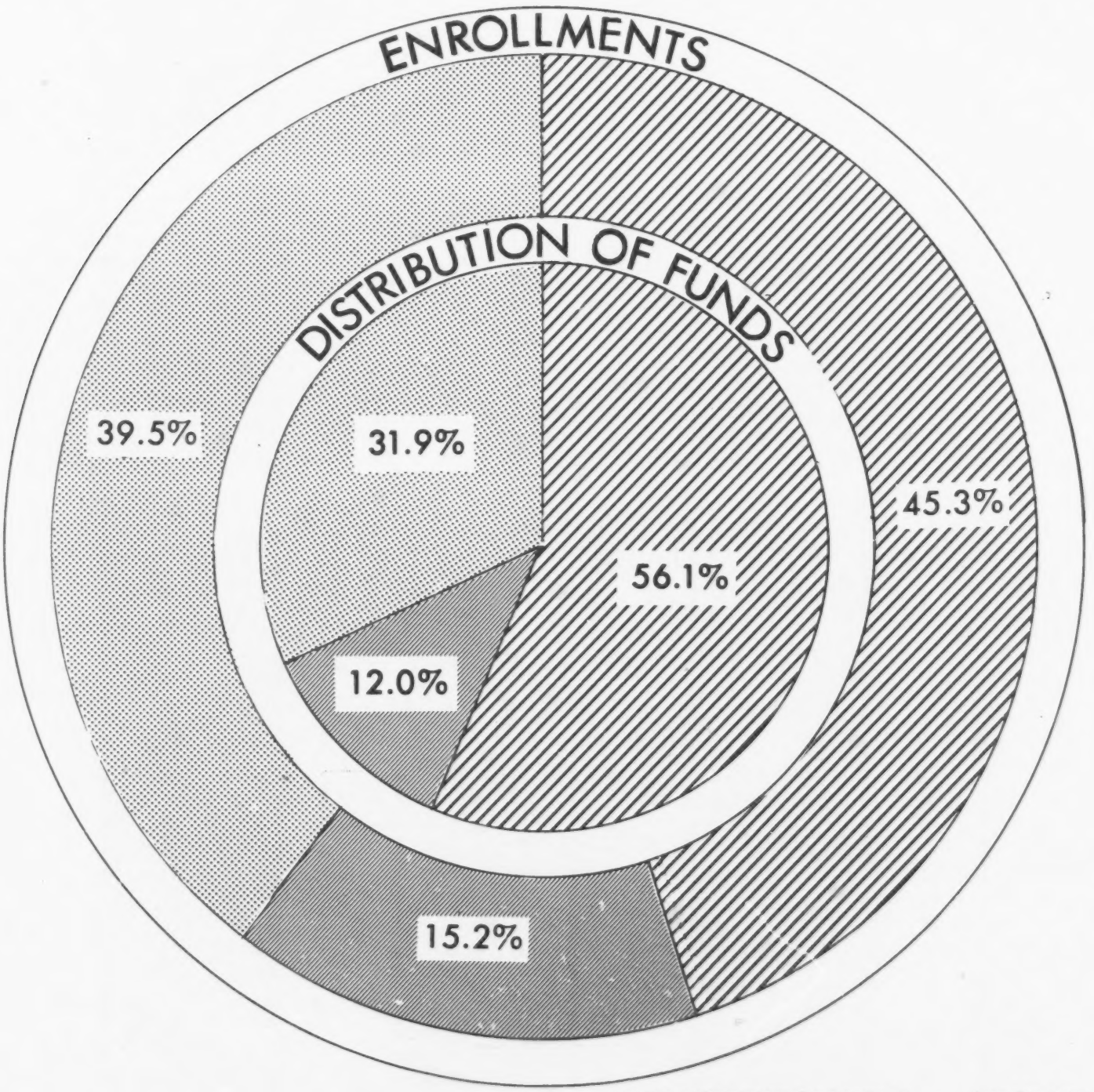
# Graph VI

## State University, City University, and Private Institutions: Number of Students Who Benefitted, 1966 - 69



# Graph VII

## State University, City University, and Private Institutions. Percent of Total Undergraduate Enrollments Compared with Percent of Total Title VI-A Funds Received, 1966 - 69




| | AVERAGE ENROLLMENT | AMOUNT |
|---|---|---|
| State University: | 173,206 | $1,498,708 |
| City University: | 66,773 | $564,789 |
| Private Institutions: | 198,893 | $2,635,163 |
| TOTAL | 438,872 | $4,698,660 |

# APPENDIX

# SURVEY OF TITLE VI–A PROJECTS: NEW YORK STATE

I. Impact of the Project upon the Institution

A. Was the project part of a long-range plan for instructional improvement? If yes, explain.
B. What is your assessment of this project's value to your institution?
C. Have any plans been made for expansion of the project?
D. Have plans been made for the use of similar equipment and/or materials in other departments within your institution? *Answer this question only if the project was restricted to a single department.*
E. What modifications might be made if the project were to be expanded?
F. Have plans been made for interinstitutional cooperation on a similar project?
G. What shortcomings in the project have you encountered?

II. Cost, Space, and Time Factors

A. Has the availability of the equipment affected costs of instruction in the short run? Do you expect that it will in the long run?
B. Do students spend more/less time in formal classroom instruction as a result of the project?
C. Do faculty members spend more/less time in class, in individual student contact, in preparation?
D. Did the project affect staffing patterns in your institution?
   1. Was there an increase?
   2. Was there a decrease?
   3. Was a reallocation of functions necessary?

III. Student and Faculty Reaction to the Use of New Equipment and Materials

A. Has the availability of the equipment changed student learning patterns?
B. Has the availability of the equipment made it possible for a student to work in the direction of his particular interests?
C. Have provisions been made for feedback from students and faculty on their reactions to the equipment? If yes, explain.

IV. State Agency Assistance in Planning

A. Other than the guidelines, did you use State assistance in planning your project?
B. Could you have used additional assistance:
   1. In selecting the most appropriate equipment for your needs?
   2. In planning personnel needs?
   3. In estimating cost, time, and space efficiency factors?
C. What additional State services would you recommend for future planning?

V. Ancillary Outcomes

A. Were there unusual side effects as a result of this project which now bear further investigation by your institution?
B. Have any investigations been conducted at your institution since the acquisition of the equipment as to its effectiveness and acceptance by faculty and students?

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